CHAPTER II

REVIEW OF RELATED LITERATURE

2.1   INTRODUCTION

This chapter deals with the review of related studies. Review of related literature is an essential aspect of a research. The purpose of the review is to expand the contextual and background of the study, to help further in defining the research problem and also to provide an empirical basis for the subsequent development of the study. It is extremely important part of any research as it shows what other researchers have already done and what other researchers are doing contemporarily. In other words, it basically helps the investigator to find various research gap. It provides methodology, tools used for data collection and techniques applied for the analysis. Thus, it provides a critical review and appraisal of the related studies and shows how the related studies contribute towards advancing the present knowledge regarding the specific area under investigation.

Investigator has reviewed the literature related to the study in the area of ICT awareness, use and need of teachers. There are numbers of studies available on ICT but in this chapter only those studies are reported which are relevant to the present study. The studies have been reported in a precise manner and an attempt has been made to develop holistic perspective of the findings in order to explain the relationship with the present study.

Review of the related literature, an essential aspect of a research study, refers to a general retrospective survey of previous writings pertaining to one"s problem. Familiarity with the related literature develops an insight into the problem, helps the student to discover what is already known, what other's have attempted to find out and what problems remain to be solved. It guards against the possible limitations and minimizes the chance of duplication or repetitions. Thus, it is essential for a researcher to know what sources are available, what sources to use. and where and how to tlnd them thereby saving many hours of aimless activity.

The present chapter is devoted to the review of research studies that are thought to have some bearing on the problem selected by the researcher. In order to develop deep insight and to evaluate the methodological practices emerging, the researcher made a survey of the available literature and reviewed the researches, in the field of teaching effectiveness, work motivation and information technology. A thorough and prudent study of various books, journals, research papers and educational reviews has resulted in the accumulation of certain amount of literature with reference to the topic under consideration. The investigator made an intensive search of all relevant studies in educational literature and selected those that were -thought to be significantly related to the topic under investigation.

For the above-mentioned purpose some of the studies have been reviewed. The studies have been classified into following categories:

1.   Review related to ICT awareness of teachers

2.   Review related to ICT usage by the teachers

3.   Review related to ICT need of teachers.

2.2 REVIEW RELATED TO ICT AWARENESS OF TEACHERS

Studies conducted by Joshi (1998), Amardeep and Singh (1998), Chauhan (2002), Asan (2002) and Wilson (2002) focus on the ICT awareness of teachers which are given as follow.

Nikilaus(1985) assessed the attitudes of Tennessee teachers toward computers in schools. The relationship of present usage of computers to affluencyof school districts, school level, gender, teaching area, years of education and years of experience was also examined. The sample for the study was 586 teachers in 18 randomly selected public schools in Tennessee. The attitudes of these teachers were inferred by their responses to items on a questionnaire developed by the researcher. 350 usable questionnaires were returned. In analyzing the data^ the chi-square test and the.05 level of probability were utilized to determine significance. Findings were: (I) Teachers viewed instructional computing to be an enduring educational innovation and felt computer experiences should be provided for all students. (2) Teachers viewed instructional computing as being motivating for students, but they were undecided concerning the effect of instructional computing on student achievement. (3) Though teachers expressed a lack of confidence in their ability to use computers in their classrooms, they indicated a high level of interest in receiving instructional computing inservice training. (4) Of the variables examined in the study, present usage or nonusage of computers by teachers seemed to have the greatest influence on their attitudes toward computers. (5) With regard to present usage, teachers from schools in the middle financial subgroup, at the elementary level,

and with a moderate amount of teaching experience (8-15 years) were significantly most inclined to be presently using computers in their classrooms.

Davis (1988) examined the attitude of early childhood teachers towards the use of computers in their classroom. The sample consisted of 229 randomly selected teachers from five school districts. A 25 item Likert scale was designed by the investigator to assess the subjects' attitude. ANOVA and Scheffe method were used for analysis of data. Results indicated that 95.80% of childhood teachers participating in the study held a positive attitude towards the use of computers in their classroom. Although positive there were significant differences in the attitudes of early childhood teachers towards the use of computers in their classroom in terms of certain teacher characteristics like age, ethnicity, years of teaching experience, prior instructional computer use, amount of computer training, amount of computer experience etc.

Hardiman (1988) studied the attitude of secondary school principals towards microcomputers. 331 principals in the state of Georgia were taken as sample. A two part microcomputer assessment survey instrument was developed for this study. ANOVA, t-test and Pearson product moment correlation were used for data analysis. It was found that the attitude of secondary school principals towards microcomputers were decidedly positive and their attitude was not influenced by

variables like age, sex, degree level, school size, school system, experience etc. taken in the study.

Dupagne and Krendl (1992) reviewed the literature on teachers' attitudes toward computers; they observed that the literature generally demonstrated positive teacher attitudes toward computers. However, several studies in the authors review reported that teachers share a number of concerns about integrating computers into their instruction. Although teachers may believe in the instructional effectiveness of computers, they remain unable to make use of the technology because they have their own limitations, such as time or lack of knowledge. The primary recommendation emerging from their review of the literature was teacher training: referring to the need for schools to invest time and resources in inservice and workshop training for teachers.

Winnas and Brown (1992) tried to discern factors affecting use of the computer by teachers. A sample of 70 fourth and fifth grade elementary teachers was taken. The study found the following set of factors-teachers" own attitudes toward computers and their feelings about being held accountable for teaching computers: the need for better on-site support for teachers: teachers' limited use of computer-related sources provided by the district and their lack of knowledge about the computer curriculum; limited allocations with regard to the number of computers available per school.

Landerholm (1995) surveyed 250 kindergarten and preschool teachers in public and private schools in a five county area of Illinois, including the city of Chicago, to identify teachers' computer attitudes, knowledge and practices. The results showed that over 90% of the teachers had positive or very positive personal and professional attitudes towards using the computer. The majority of teachers had learned to use a computer through workshops, university classes or on their own. Very

few teachers had received instruction at school from a school computer instructor.

Rosen and Weil (1995) examined "technophobia" as an explanation for low levels of computer utilization. 171 Elementary teachers, 117 secondary science teachers, and 200 secondary humanities teachers in 54 schools across five urban school districts completed three measures of technophobia and a measure of demographic characteristics, computer experience, computer availability, and current computer use. Results indicated that: (1) many teachers were technophobic.

particularly elementary teachers and secondary humanities teachers; (2) teachers were most worried about dealing with the actual computer machinery in their classroom, about computer errors, and about learning to use computers; and (3) predictive models showed that although computer experience was the most prominent predictor of technophobia, it was not the only predictor — age. gender, teaching experience, computer availability, ethnicity, and school socioeconomic status also play an important role in predicting technophobia.

Joshi (1998) carried out a survey on teacher educators' computer awareness. The major objective of the study was to find out computer awareness level of the teachers of 31 teacher education colleges and P.G.Department of Education of different universities of Gujarat state. Findings of the study revealed that forty two percent of the secondary teachers education colleges has computers. Sixty eight percent of teacher educators hired the computer services and those mainly admitted that the use of computers is beneficial to them.

Amardeep and Singh (1998) conducted a study on the awareness of teachers on Educational Technology with a sample of forestry Institutions of U.P. The objective of the study was to assess the level of awareness of teachers about instructional materials, devices and methods. For data collection an interview schedule and a questionnaire were used. For data analysis mean and standard deviation and total weighted score were used. The findings of the study revealed that in case of overall awareness about instructional materials, majority of teachers were moderately aware about ET. Total Weighted awareness Score (TWS) for chalk board was found maximum (133) followed, overhead projector and transparencies (131), slides and slide projectors (118), Posters (118), chart (117), Specimens (115) and model (112). TWS for other Materials viz. Video cassettes, audio cassettes, programmed Instructions, teletext, videotext, Computer Assisted Instructions and instructional television broadcast, varied between 50 and110, indicating comparatively low level of awareness among the teachers.

Chauhan (2002) conducted a study on the awareness of teachers in intranet/internet working at higher secondary school in Vadodara city. The objectives of the study were to know the awareness of teachers and students in intranet/internet and their use in activities like teaching-learning process, homework, office work, and project work. The sample of the study was consist of six higher secondary schools of Vadodara city. To collect data questionnaire was prepared. Data analysis was done in terms of frequencies and percentages. The findings of the study revealed that 100% teachers and students were awareness about the use for intranet/internet in the higher secondary schools with internet facilities. 20% of students and 30% of teachers were found aware about

the usefulness of the intranet/internet in the school without intranet/internet facilities. The students and teachers use internet for several purposes like study, project works, to get information about results, etc.

Asan (2002) carried out a survey on computer technology awareness by elementary school teachers. To examine the perception and awareness about specific technologies, 252 teachers working in schools in Trabzon, Turkey were surveyed, with the help of a questionnaire. The main objective was to study computer technology awareness of elementary school teachers. The variable taken in the study were gender, position, teaching experience and school type. The data were collected from the sample selected using random sampling method. Findings of the study revealed that only thirty nine percent of the respondents were found to be computer users, while sixty percent of the respondents reported that they were not computer users. Data in this study revealed that overhead projectors, printer, keyboard, modem, hard disk and video camera received the highest ranking as essential items for teaching and learning, whereas the items like, compact disc, scanner, sound card and television card were ranked lowest. In this study, significance differences were found to exist between males and females teachers in their familiarity of computer technologies.

Wilson (2002) conducted a study on the digital divide: a study of teacher awareness and efforts to address the issue. The purpose of the study was to point out the awareness level of teachers in digital divide. The research design was descriptive in nature, asking teachers to respond to the survey that sought to reveal their awareness of the digital divide. The study revealed that the teachers were the intermediate users

of Technology. And the researcher concluded that the teacher must be provided opportunities to acquire the professional development necessary to facilitate the successful integration of technology in their classrooms.

Rathod (2002) has conducted a study on computer awareness of secondary school teachers. Main objective of the study was to study the awareness of secondary school teachers in computer. Thirty one secondary school were randomly selected and 133 teachers of these schools were considered as sample of the study. A questionnaire was used for data collection. Data were analyzed using percentage, mean and sd. Findings of the study revealed that 11.31% of secondary teachers were aware of computer.

Blankenship (1998) determined the extent to which the following factors predict computer use by teachers in classroom instruction: attitudes of teachers toward computers in the classroom, access by teachers and students to computers, training of teachers in computer use, support of teachers in their use of computers, age of the teacher, grade level in which the teacher teaches, curriculum area in which the teacher teaches, gender of the teacher, and number of years the teacher was from retirement. The population of the study was the classroom teachers of Carroll County (Virginia) Public Schools. A survey instrument was designed to measure computer use and the factors related to use. The responses from the survey were analyzed with multiple regression techniques to determine which factors were predictors of computer use by teachers in classroom instruction. The nominal group technique was used to create a prioritized list of strategies to improve teacher use of computers by focusing on the factors determined to be predictors.

Factors that predict computer use varied, by grade level. Training was the most common predictor followed by attitude, support, access. and age of teacher. Attitude toward computers by Carroll County teachers was favourable across all grade levels.

McCarthy (1998) focused on the attitudes of New York City teachers of -special education toward the use of computers and their usefulness in educating students with disabilities. The researcher also wanted to examine if a significant relationship existed between the teachers" attitudes toward computers and their level of involvement with computers. The researcher constructed a demographic survey sheet along with a Likert Scale-based survey instrument to gather data on the sample and their attitudes towards computers. The survey and demographic questionnaire were distributed to 150 New York City public school special education teachers. Based on the results of an item-by-item analysis of the demographic questionnaire and survey instrument combined with a statistical analysis of relevant variables, it was found that the sample had a positive attitude toward the use of computers in special education. This study also found that there was a significant relationship between the attitude towards computers and the level of involvement with computers.

Morales (1998) studied the attitudes of Ninth Graders and their Teachers toward computers and informatics. Likert scale questionnaires (Computer Attitude Questionnaire (CAQ 5.22), whereas a portion of the Survey of Teachers' Attitudes toward Computers (TAC 2.22)) were administered to 78 Mexican Teachers and 590 Ninth Graders from 4 States Nuevo Leon. Guanajuato, Tlaxcala and Qiiintana R0o. Analysis of variance indicated major differences among States, in all the variables

measured in both samples. Electronic mail appeared to have the strongest positive attitude among students and teachers from Nuevo Leon, compared to the less positive attitudes of students and teachers from Quintana Roo. On the other hand, differences on Computer enjoyment appeared to be more evident between the States of Guanajuato and Tlaxcala. Guanajuato students and Tlaxcala teachers seemed to be the most enthusiastic about using and enjoying a computer. On the contrary, the less enthusiastic were Guanajuato teachers and Tlaxcala students. Teachers from Guanajuato seemed to be most sceptical about being a better teacher if they had a computer in the classroom, but teachers from Tlaxcala seemed to have the opposite point of view.

Box (1999) designed Teachers and Technology: A Snap-Shot Survey (Version 3.1) to ask teachers directly about their classroom technology related needs and beliefs. It includes demographic questions, a Likert-like section on beliefs, a 5-point scale on urgency of technology needs, questions about student and instructional time using computers and a stage of technology adoptions self assessment. The survey was distributed at a meeting at the high school in a north Texas town. A total of 97 surveys were collected of which 72 (74%) were high school teachers. The sample contained 39 (40%) males and 54 (56%) females. Findings showed that while there were computers in about half the classrooms at this high school, many teachers did not plan for student use of the technology. They had sufficient motivation but did not believe that they have the tools or skills to integrate technology into the curriculum.

Cox, et al. (1999) carried out a study examining the factors relating to the uptake of ICT in teaching. A questionnaire was designed to collect evidence from teachers and other educators. The sample consisted of 44 male and 28 female computer-using teachers. The results showed that the teachers who were already regular users of ICT had confidence in using ICT, perceived it to be useful for their

personal work and for their teaching and planned to extend their use further in the future. The factors that were found to be the most important to these teachers in their teaching were: making the lessons more interesting, easier, more fun for them and their pupils, more diverse, more motivating for the pupils and more enjoyable. Additional more personal factors were: improving presentation of materials, allowing greater access to computers for personal use. giving more power to the teacher in the school, giving the teacher more prestige, making the teachers' administration more efficient and providing professional support through the Internet.

Moseley and Higgins (1999) studied the attitudes of a small sample of 4eachers. They found that teachers who successfully made use of ICT had a positive rather than negative attitude towards ICT. Teachers who have positive attitudes towards ICT itself will be positively disposed towards using it in the classroom. They 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.

Chifari, et nl. (2000) explored some cognitive and motivational correlates o(teachers' attitudes towards the computer in school. They compared teachers "perceived self-efficacy" (Bandura, 1986; 1997) with

their approach to the computer, as an educational tool. A computer self efficacy scale, modified from an English version developed by (Eachus and Cassidy, 1997) was administered to 43 teachers from various schools. The same subjects filled in a questionnaire which was provided for exploring their computer experience. Results revealed high correlation between self-efficacy and computer experience, suggesting that self efficacy was an important cognitive correlate of positive attitude towards the computer.

Gray and Souter (2002) conducted a study to examine the impact that the -initiatives were having on ICT use in secondary schools i.e. the use of ICT in secondary subject areas, and the perceptions of teachers in these areas. From the survey, returns were received from 393 teachers. A comparison of science teachers' perceptions was made with teachers from other disciplines. Examination of the data indicated that, relative to other subject teachers, science teachers came out positively with regard to use of and confidence in ICT. However, in absolute terms although the availability of computing facilities was reportedly quite high, actual level of use was quite low. In addition, where level of use was higher, it was with regard to a rather narrow range of applications, particularly word-processing. Although there appeared to be an awareness of the potential for ICT in science, teachers indicated that they did not see the introduction of ICT radically changing the way in which teaching took place, nor changing the teacher-pupil relationship. Science teachers were reasonably confident in their use of ICT but felt that they needed much more in the wav ot support and professional development to maximise their use of ICT in the classroom.

Demetriadis, et al. (2003) presented observations regarding Greek secondary school teachers* attitudes towards the introduction of ICT in the curriculum. The study showed that teachers were 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 was seen as initiating a "negotiation"' process where lower level goals may be altered to preserve what were perceived as goals of higher order. Teachers" attitude to adapt ICT mode of use was supported by research evidence that emphasize the situational character of knowledge and expertise. The authors proposed that teachers' training should be combined with actions that advance school epistemology toward a multiple context learning perspective. Such an extended action might be the establishment of extended learning communities that would help brings together out-of school learning contexts and learning activities.

Erkan (2003) examined how teachers perceive the incorporation and use of computer technology resources through investigation of teachers' attitudes. The study also examined whether and to what extent opportunities, facilities, and training provided to teachers contribute to their acceptance and use of these resources. The data was collected through questionnaires distributed to 97 teachers. Based on the results of the questionnaires, a stratified sample of 12 teachers was selected for follow-up interviews. The questionnaire results revealed statistically significant differences between teachers who had undergone computer technology training and those who had not in terms of their attitudes toward computers and the use of computer technology resources in language teaching. Follow-up interviews were used to determine whether positive attitudes or interests led people to undergo training or

the reverse. The responses supported both cases for different individuals. The results also showed that simply introducing computer technology resources does not guarantee teachers" use of these in practice. The provision of training was seen as a key factor in both changing attitudes and encouraging teachers in incorporating technology into their instruction.

Matthiasdottir, et al. (2003) focused on the use of ICT tools by teachers, their attitudes toward the use of ICT in teaching and how it relates to their teaching. The research study was conducted in 14 Icelandic high schools and one private School. The response rate was 47% or 423 answers out of 906-. The questionnaire was developed for this study in 2002 by the authors. The main findings of this study were that the use of the Internet was quite common among Icelandic high school teachers. Teachers searched the Net for materials to use in their teaching and send and receive student projects and essays. Teachers were positive toward ICT use as most of them (81%) agreed that it was preferable to use computers in teaching, but were not widely taking advantage of the range of opportunities ICT offers, such as interactive exams and web discussions. Nor were they convinced that the use of ICT in teaching will lead to better student outcomes.

Tsitouridou and Vryzas (2003) investigated the attitudes of early childhood teachers towards computers and information technology. The study examined whether or not attitudes were differentiated by a series of factors. The subjects of the survey were 107 inservice female early childhood teachers, taking part in a two-year programme of inservice training at the Department of Early Childhood Education of the Aristotle University of Thessaloniki, Greece. The results indicated that early

childhood educators had limited access and positive but temperate attitudes to the world of computers. Teachers' attitudes appeared to be influenced significantly by computer use at home, experience with computers and inservice training.

Albirini (2004) investigated the attitudes of EFL teachers in Syrian high schools toward ICT in education and to explore the relationship of teachers' attitudes with a selected set of variables. Teachers' attitudes were examined from two related theoretical frameworks: Rogers's (1995) Diffusion of Innovations and Ajzen and Fishbein's (1980) Model of Reasoned Action. A questionnaire was developed and distributed to 326 sample teachers selected randomly from the population. The survey stage was followed by in-depth phone interviews with a purposeful sample of 15 teachers. Results from both quantitative and qualitative data indicated that the participants had positive attitudes toward ICT in education. While the participants had somewhat positive perceptions of the attributes of computers, they were relatively neutral about the cultural relevance of ICT to Syrian society and schools. The teachers also reported low levels of computer competence, access, and training. Significant positive correlations existed between teachers' attitudes toward ICT and five independent variables, including computer attributes, cultural perceptions, computer competence, computer access, and computer training. Multiple regression analysis indicated that only the first three of the above independent variables had a significant predictive value of computer attitudes toward 1CT. The results indicated that 0.58% of the variance in computer attitude was explained by the independent variables included in this study.

Batane (2004) investigated how practicing teachers in one secondary school in Botswana were prepared to work with technology in their classes. Data was collected through in depth interviewing of the principal, 15 teachers and 3 officials from the Ministry of Education. Findings indicated that teachers who had already acquired computer knowledge through their own initiative do the technology teacher training in this school. Teachers were also not satisfied with the training that they were given. It was reported in this study that when technology was first introduced in the schools, teachers who already had some knowledge about computers were the first to get involved in working with computers. It was reported that the first reaction from the teachers as the computers were being introduced in schools was that computers were for math and science subjects The study recommended a more systematic approach to teacher training in the school so that more teachers could be involved and benefit from the training.

Coffland and Strickland (2004) sought to identify variables related to teacher use of technology in secondary level geometry classrooms in south-eastern Idaho. The primary variables examined in the study were teacher technology awareness, teacher attitude toward technology, teacher technology training, and teacher computer use for instruction. This study also tested for associations between these primary variables and principal attitude toward technology and a selected group of demographic variables: geometry teaching experience, number of sections of geometry taught, college mathematics major, and computer lab access. Four significant relationships were found. An inverse relationship was found between teacher computer use and the number of geometry sections taught. Direct relationships were found between teacher attitude and both teacher technology awareness and principal

attitude. Finally, a direct relationship between type of teacher training and teacher instructional computer use was reported.

Gomleksiz (2004) explored the views of teachers regarding the use of technology in their classes. 150 English teachers were surveyed on a scale consisting of 36 items, measuring positive and negative attitudes of English teachers toward use of technology. It was determined that teachers have positive attitudes toward use of technology but they do not obtain or use technology at desired level.

Simonsson (2004) examined the technology use in classroom by teachers as a function of their beliefs, attitudes and perceptions. A sample of 103 Hispanic bilingual elementary school teachers along the south most borderlands of Texas and Mexico were taken. The teachers responded to items regarding their (I) beliefs about and utilization of technology when incorporating cultural components. (2) general attitudes toward technology and self-efficacy towards utilizing technology, and (3) perceptions about their peers' utilization of technology. A stepwise multiple linear regression analysis was employed to measure teacher technology use. The total variance explained was 50.6 percent. Means, S.D. and standard errors of means statistics were presented. Results indicated that the use of technology was a function of the bilingual teachers" beliefs, attitudes, and the extent to which their colleagues use technology in the classroom.

Sugar, et at. (2004) examined teachers' beliefs about technology adoption as a reasoned, deliberate, intentional decision-making process, as reflected in Ajzen's (1985) Theory of Planned Behaviour. Qualitative and quantitative data were collected from teachers in four schools located in the south-eastern region of the United States. Overall results

indicated that technology adoption decisions were influenced by teachers' individual attitudes towards technology adoption, which were formed from specific underlying personal beliefs about the consequences of adoption. External support from key persons and contextual resources (e.g. funding) were insignificant factors affecting teachers' technology adoption decisions.

Mcgrail, E. (2005) examined teachers' interpretations of the relationships that they were engaged in within their frames of reference in the classroom with technology and technology-literate students. Informants included middle and high school English teachers with varying teaching and technology experiences. In-depth interviewing was selected for data collection. Results from the study revealed that teachers described their attitudes toward technology through considerations of what they seemed to gain from it, what bothered them about their own or their students' computer use, as well as what they would like to see done in their environments so that they could employ technology on a more regular basis. Teachers in this study tended to apply a critical lens when they reflected on their experiences with technology in their classrooms; some teachers were ready to question its usefulness for either their students' progress or for their own advancement. Most teachers in this study, however, did not question or reject technology altogether. Rather, they shared the multiple concerns that technology brought into their practice. From a pedagogical stance, a few teachers noticed that some students, especially young children, had conceptual difficulties when learning to use computers. The teachers in this study were willing to accept change as long as they were convinced that it would allow them to see a gain for their students as well as for their own instructional practices. Administrators, on the other hand,

were reported to push for technology, for they appeared to perceive it as the ultimate goal in any educational context.

Sa'ari, et al. (2005) measured teachers' attitudes and perceived competency towards information technology (IT). The sampling frame of the study consisted of secondary school in-service teachers in three selected schools, each representing the three districts in Malacca: Alor Gajah, Melaka Tengah and Jasin. A total of 160 teachers were taken as the sample of the study. The instrument used in this research was a questionnaire in the Malay language. The results revealed that most teachers possessed positive attitudes towards IT. The findings also established that most teachers had moderate levels of IT competency. They also believed that they still lack the appropriate IT skills to integrate the technology into the teaching and learning process. The results of MANOVA analysis indicated that there were significant differences between the group of competent and incompetent teachers in terms of usefulness, confidence, anxiety and aversion toward the use of IT.

Sugar, et al. (2005) applied the Theory of Planned Behaviour (TPB) (Ajzen. 1988) to assess teachers' technology attitudes. Six teachers participated in semi-structured interviews, and teachers at four schools completed a follow-up, a 45-item questionnaire. In this colloquium, they critiqued the efficacy of the TPB as a basis for assessing teachers' technology attitudes and beliefs. They concluded that The Theory of Planned Behaviour offered researchers fruitful avenues in examining teachers' decision-making processes, particularly in regard to technology use. They also encouraged researchers to use this model in assessing

teachers' attitude towards technology and begin to explore new applications of the model.

Kiridis, et al. (2006) elucidated the perceptions and the attitudes of Greek teachers towards the use of ICT, and explored the potential of the integration of new technologies in public primary education. The sample consisted of 951 primary school teachers from all over the country. The results revealed that although the majority of the respondents believed that 1CT was a useful tool for teaching and learning, and generally agreed with its exploitation in schools, it appeared that they were not yet fully convinced about the advisability of the immediate introduction of new technologies in primary education.

Sadik, A. (2006) assessed Egyptian teachers' attitudes toward personal use and school use of computers. Data was provided by a sample of 443 teachers. It was observed that overall, teachers had high scores on the attitude scale but male teachers had more positive attitude than female teachers. Moreover, teachers who had positive attitudes toward their personal use of computers also felt positive toward the use of computers in schools. Trained teachers expressed more positive attitudes toward the importance and usefulness of school use of the computer and had higher confidence than did non trained teachers. Also, teachers who had long teaching experiences were more likely to appreciate the importance of computer use in schooling

Samak (2006) explored factors that may influence the attitudes towards information and communication technology (ICT) by Jordanian teachers of English as a foreign language (EFL). The Diffusion of Innovations (Rogers, 1995), and the theoretical relationship between attitudes and behaviour posed by the Theory of Reasoned Action (Ajzen and

Fishbein. 1980) served as a theoretical framework. A multi-sections survey in Arabic language was administered to the EFL teachers in the first and second districts of the capital city of Jordan, Amman. A random sample of 363 was utilized. The data was analyzed using both descriptive and inferential statistics. The study showed that Jordanian EFL teachers had positive attitudes towards ICT. They had a moderate computer competence and have a high access to ICT. It was also found that Age and teaching experience had a negative correlation with attitudes, whereas qualitication had a positive correlation with attitudes. There was a weak positive correlation between training and attitudes. Type of training, obtaining an ICDL Certificate, and length of training were explored. Gender, teaching methods, and Grade level were found not significantly correlated with attitudes towards ICT. 64% of the total variance in Jordanian EFL teachers' attitudes towards ICT was explained by the four main independent variables of the study: attributes cultural perceptions, competence, and access. ^* Wozney, et al. (2006) investigated the personal and setting characteristics, teacher attitudes, and current computer technology practices among 764 elementary

and secondary teachers from both private and public school sectors in Quebec. Using expectancy-value theory, the Technology Implementation Questionnaire (TIQ) was developed. In addition, teacher demographics, teachers7 current uses of technology, and availability of resources were also surveyed. The study found that: (a) expectancy of success and perceived value were the most important issues in differentiating levels of computer use among teachers; (b) personal use of computers outside of teaching activities was the most significant predictor of teacher use of technology in the classroom; and (c) teachers' use of computer technologies was predominantly for

"informative" (e.g., World Wide Web and CD-ROM) and "expressive" (e.g., word processing) purposes.

Boon et at. (2007) examined teachers' attitudes and perceptions toward the use of technology-based instruction (i.e., Inspiration 6 software) as an effective instructional strategy in inclusive social studies classes. Three high school social studies teachers, one general education and two special education teachers completed a 6-item open-ended survey on the effects of Inspiration 6 software, a computerized graphic organizing software tool. Responses indicated that teachers were positive toward the use of the software and reported the software had the potential to (a) improve student learning, (b) increase student engagement, (c) provide important study skills, and (d) improve student motivation through the novelty of using computers in social studies instruction.

Hung and Hsu (2007) analyzed the current status of computer-based technology (CBT) use in secondary schools in Taiwan. A questionnaire was developed to investigate teachers' attitudes toward computers and their application of CBT in instruction. A random sample of 100 secondary school science teachers was taken. The surveyed teachers had a very positive attitude toward computers, yet the researchers found their attitude was significantly correlated with their age and seniority. The older and more senior teachers generally held a less positive attitude toward computers. As for the application of computer-based technology in classroom instruction, most teachers claimed at least a moderate degree of implementation of CBT in the classroom. In gender difference, male teachers in general used more CBT in their instructional strategies than did female teachers. As far as age was concerned, middle-aged and more experienced teachers tended to

integrate more CBT into their instruction than younger and novice teachers, even though the latter group held a more positive attitude toward computers. In correlation analysis they discovered that with male but not with female teachers, there was a direct correlation between degree of positive attitude toward computers and degree of application of CBT in classroom instruction.

Petros (2007) developed and tested the psychometric properties of a computer attitudes scale for the Greek population. A Greek Computer Attitudes Scale (GCAS) of 30 items, with three subscales: confidence, affection, and cognitive was developed. The study also explored sex differences on the GCAS, and the relationship between age, computer experience, and confidence with computers and participants' responses on the scale. Questionnaire data from four Greek samples, which included participants from the general population (185 and 354 individuals, respectively), 222 teachers and 99 undergraduate students, were analyzed. Results indicated that: (1) both the reliability (internal consistency and test-retest) and validity (concurrent) of the GCAS were adequate; (2) the relationship between age and computer attitudes was not significant, whereas sex did not have a significant effect on computer attitudes scores; and (3) perceived computer experience and confidence with computers were strongly related to favourable attitudes toward computers.

Ogunkola (2008) investigated the effect of computer attitude, ownership and use on the computer literacy of science teachers in Nigeria. 120 science teachers drawn from the four political divisions of Ogun State, Nigeria were used for the study. Two valid and reliable instruments namely Computer Attitude, Ownership and Use Scale and

Computer Literacy Self Assessment Scale were used to collect the needed data. Percentages, standard deviation and multiple regression statistics were employed for data analyses. The findings revealed that the science teachers had a positive attitude towards computer. Also, computer attitude, ownership and frequency of use jointly predicted the science teachers' computer literacy with the influence of computer ownership being the highest when considered individually.

Cavas, et al. (2009) investigated the Turkish primary science teachers' "attitudes toward ICT in education and explored the relationship between teachers' attitudes and factors which were related to teachers' personal characteristics (gender, age, computer ownership at home, and computer experience). In order to collect data, an instrument (STATICTE) was developed by researchers and administered to 1071 science teachers almost uniformly distributed in 7 geographic regions of Turkey. In data analyses, descriptive statistics were used to describe and summarize the properties of the mass of data collected from the respondents. The results indicated that Turkish science teachers have positive attitudes toward ICT and although teachers' attitudes toward ICT did not differ regarding gender, it differed regarding age, computer ownership at home and computer experience.

Chen and Chang, proposed the whole teacher development approach as an organizing framework which was distinguished by its simultaneous focus on teacher attitudes, skills and knowledge, and practices. To test the approach, a study of teachers' technology proficiency was carried out. A total of 175 teachers from the Head Start program in the Early Childhood Department of the Chicago Public Schools participated in the study. Of the 175 teachers. 134 had completed a two-day session of

introductory computer training. The remaining 41 teachers completed a year-long professional development program in technology based on the whole teacher approach. All teachers completed a self-evaluation questionnaire. On the questionnaire, teachers rated their competence in terms of specific indicators for attitudes, skills, and practices. Pearson correlation tests were used to determine the degree of association among measures of teacher attitudes, skills, and practices. Among teachers who participated in a technology program based on the whole teacher development approach, significant degrees of association among attitudes, skills, and practices were found. High degree of association between attitudes and skills was found which suggests that gaining confidence plays a central role in increasing technology proficiency. In statistical terms, confidence accounted for approximately half of the variability found in all teacher ratings of knowledge and skill levels. In applied terms, teachers who developed positive attitudes toward computer use were more likely to be enthusiastic about computers as learning tools, confident in their ability to learn and apply new skills, and successful in computer integration. Further, program participants reported significantly higher levels of technoloev skill and classroorrLDractice than nonnarticipants.

2.3   REVIEW RELATED TO ICT USAGE BY TEACHERS

Studies conducted by Solachi (1991), Gail (1999), Niederhauser and Stoddart (1999), Duckett and Wanda (2001), Batane (2002), Toth (2002), Singh (2003), Tiliakos (2003)   and Sikdar (2004) focus on the ICT Usage by teachers which are given as follow.

Solachi (1991) carried out a study on the availability and utilization of educational technology in the higher secondary schools. The major objectives of the study were to find out the various aspects of educational technology and extent to which educational technology was utilized by higher secondary schools. The sample consisted of 220 teachers taken by means of stratified random sampling techniques. And questionnaire was used for data collection. Findings of the study revealed that radio, audio tape recorder, globe, T.V. were available in the school. And these technologies were more utilized by the humanity teachers**.**

Gail (1999) conducted a study on predictors of teacher use of technology. This study examined the predictors of computer use by teachers on a semi rural school district. The variables examined were intended personal use of computers, intended use of computers for classroom instruction, and intended use of computers for classroom management. One hundred and forty-six teachers from elementary schools, middle schools and high schools were surveyed, Questionnaire were used for data collection along with computer attitude scale and innovativeness scale. The results of this study indicated that younger, less experienced teachers with a higher level of educational attainment and grater self-reported computer ability are more likely to demonstrate a greater appreciation for computer usefulness and computer liking. These teachers are more intend to use. Computers for personal use; classroom instruction and innovativeness were not found to be significant predictors of teacher use of computers.

Niederhauser and Stoddart (1999) carried out a survey to find out teachers instructional perspectives and use of educational software by 1093 teachers with the help of a questionnaire. The purpose of the study was to examine the relationship among teachers' perspectives about effective instructional uses of computers and the types of software they used. The other variables of the study were grade, gender, teaching experience. The overall results indicated that the majority (85%) of the teachers participated in the study used skill based software for instruction, either solely (36%) or at least a part of the time. A large number of these teachers (49%) were in the combined group and very few teachers (15%) relied only on constructivist- oriented software. The result of this study indicated that teacher's perspective about effective computer based pedagogy is related to the types of software they use with their students.

Duckett and Wanda (2001) has conducted a study on the comparison of teachers' perceptions of the use of computers between a school system with mandated professional development and a school system with optional professional development. The major purpose of this study was to determine what perceptions teachers had in two public school districts regarding the impact of computers upon the instructional process in their classroom, teacher level of comfort with computer use, administrative use of computers in the classroom, and frequency of use of computers in each teacher's classroom. A quantitative survey instrument was designed for data collection. ANOVA was used to make comparisons of teacher's perceptions regarding the use of computers in their classrooms as measured on a Likert-type scale. One of the major findings in the study was that gender played a role in the teacher's perception regarding the impact of the use of computers upon the

instructional process, teacher's level of comfort with computer use, the administrative use of computers in the classroom and the frequency of use of computers in each teacher's classroom. Another major finding of the study was that there were significant differences in teacher perceptions between school systems with mandatory versus optional professional development in the frequency of use of computers in their classroom.

Batane (2002) conducted a study to know technology use in secondary schools of Botswana. The focus of the study was on two secondary schools in Botswana that have implemented technology use in their classroom. The purpose of the study was to investigate how computers are used in the classroom and also to find out the attitude and perception of teachers, students and administration towards technology. For data collection participant observation and in depth interview were used as tools. Findings of the study indicate that computer is used as subjects with basic skills in working with computers. Teachers of various subjects also use computers to teach different parts of their syllabi. Computers were used to retrieve, analyze and present information.

Paramar (2002) has conducted study on the use of Educational Technology in primary schools. The main objectives of the study were (1) to study the extent of use of Educational Technology in classroom. (2) to study the appropriateness of the use of Educational Technology in the classroom. 192 teachers were taken as the sample for the study. A questionnaire was used for data collection. Findings of the study revealed that blackboard and textbook were used maximally by the teachers, whereas CAI, camera, video cassettes player , audio cassettes

player and slide projectors were difficult to found to be used by the teachers.

Toth (2002) conducted a study on teachers' motivation and use of computer based interactive multimedia. The purposes of the study were (1) to describe the use of multimedia by teachers within a participating population of teachers, and (2) to identify factors that motivate teachers to use multimedia for instruction purposes.

The study was conducted in two phases and a questionnaire was used for data collection on the use and development of multimedia in the first phase. Interview was used to identify the factors that motivate teachers to use multimedia in the second phase. Findings of the research indicated that majority of teachers (64%) were using educational software and 47% were using internet. And all believed multimedia a powerful tool and they were ready to integrate that in educational setting.

Singh (2003) conducted a study to find out the extent of usage of Information Communication Technology and related problems faced by teachers. The sample of the study comprised of eighty teachers of the M.S. University of Baroda taken purposively. Questionnaire was used to collect the data. The main objectives of the study were to study the usage of the selected information communication technologies and the related problems faced by the teachers. The variables of this study were area of study and type of users, teaching experience and interest in ICT. Findings of the study revealed that nearly sixty percent of the teachers faced problems related to self to less extent in the usage of the selected ICTs. High majority of the teachers (81.3%) used the selected ICTs to some extent only. More than half of the teachers faced problem related

to institution to some extent in the usage of the selected ICTs. More than fifty percent of the teachers faced the problem related to the students to less extent in the usage of the selected ICTs.

Tiliakos (2003) carried out a study to understand teacher use of the internet as a new learning and teaching tool. The study explores teacher's use of internet technologies as a tool for instruction. It analyzed the ways teacher made sense of internet technologies within the context of her/his professional beliefs and practices in the classroom.

The study used qualitative methodology design and data were collected through field notes from participant observation. The result of the study provides descriptive insight into how a teacher learns to understand and use new instructional technologies such as internet.

Sikdar (2004) has conducted a study on the usage of computer and internet for educational purpose by the teachers of the M.S. University of Baroda in the year of 20003-04. Major objectives of the study were to study the usage of computer and internet by the teachers of the M.S. University of Baroda with respect to teaching purposes, research purposes and other purposes and to study the differences in the use of computer and internet by the teachers in relation to selected variables like sex, age, years of computer uses, computer accessibility, designation, teaching experience and computer training. Sample of ninety teachers were selected by purposive sampling technique. To collect data structured questionnaire was used. To analyze the data SD, t' – value and 'F' value was found out. Findings of the study revealed that more number of the respondents was using computer and internet for most of the times for research purposes. Whereas majority of the respondents were using it sometimes for teaching purpose and for other

purposes. They used computer and internet to less extent. Computer and internet usage for educational purpose did not differed significantly in relation to sex, age, designation whereas it was found significantly different in relation to the variables like, years of computers uses, computer accessibility, teaching experience and computer training.

2.4 REVIEW RELATED TO ICT NEED OF TEACHERS

Studies conducted by Martin (1997), William (1997), Beckwith (1999), Sindylek (2000) focus on the ICT need of teachers which are given as follow.

Martin (1997) conducted a study on the computer based technology utilization by elementary teachers. The main objective of this study was to explore factors that have impact on teachers' utilization of computer technology. The population used for this study was elementary classroom teachers in the Columbia Public School District during the 1996-97 school years. Questionnaires were sent to all elementary classroom teachers. 54% of respondent returned response. The result of the study revealed that lack of time, the lack of a sufficient knowledge base, and the lack of available hardware and software were the inhibitors of teacher's use of computer technology. Teachers need to have computer technology readily available, along with the time to learn computer applications and the assistance necessary to create a sufficient knowledge base, in order to fully utilize it.

Williams, (1997) has conducted a study on Teachers' ICT skills and knowledge need. The objectives of the study were, (1) to investigate teachers' needs for knowledge and skills in relation to the effective use

of ICT; (2) to suggest ways of enhancing future design and delivery of self- and staff-development in order to increase and improve the level of ICT use in Scottish schools. Questionnaire were used to collect the data. The overall picture which emerges from Scottish teachers is a relatively positive one. There is a great deal of interest and motivation to learn more about the potential of ICT and an acknowledgement that this is the direction things are likely to take in the future. Ninety-eight per cent of primary teachers use computers. Secondary teachers were using word processing more in compare to primary teachers. Interestingly, although the Internet is available in the majority of secondary schools (the figure was 60% in 1996/97 [Scottish Office, 1998]), the level of use of WWW and e-mail is still relatively low. This is likely to be a combination of lack of knowledge and lack of what many teachers would regard as ready access, i.e. close to the areas they teach in.

Beckwith (1999) conducted a study on using multimedia technology as an instructional tool to enhance learning. The problem addressed by this study was that too many educators fail to use the vast potential of computer software to turn complex, multi-ractor verbal concepts into visual depictions that can be more readily and easily understood to enhance instruction and learning. The samples for this study were 125 subjects. A questionnaire was used to collect the data. The research in this study provided conclusion that the majority of the teachers in the Inglewood unified school district were aware, that technology can be used to enhance learning in the classroom, but it also affirmed that most of them did not use it as a prominent part of their instruction because of one or more key factors. They did not have sufficient experience with and knowledge of technology and /or resources to use it.

Sindylek (2000) studied the historical and current usage of computer by public high school core content subject area teachers in U.S.A. The purpose of the study was to determine how the computer met the needs of people, to determine the impact of computer technology on education and to determine the reported level of expertise and the professional development needs related to technology. The result of the study indicated that the computer had been used to meet the needs of people and society. And the information presented regarding the uses of computer indicate that students can benefit from instruction enhanced with technology. It also indicated a lack of computer skills of the respondents and lack of computer use for instruction.

2.5   OBSERVATIONS FROM THE REVIEWED STUDIES

From the above review of the related studies, it can be concluded that most of the studies are either related to awareness or use of technology. It can be further stated that most of the studies are specifically related to the computer and internet Further looking at a glance to the above studies, it can be revealed that most of the studies were conducted abroad and very few studies were conducted in India. Many of the studies revealed that a great degree of awareness about the ICT of teachers but less usage due to one or other reasons. Further, it was found that there were many studies carried out related to teachers' awareness of technology and teachers use of technologies but only few studies conducted which are related to the teachers need of technologies. No study was found with the combination of ICT awareness, use and need of teachers in an integration whole. Hence the present study is an

attempt in this direction to study the ICT awareness, use and need of secondary and higher secondary school teachers.

2.6   IMPLICATION OF REVIEW OF RELATED STUDIES FOR THE PRESENT STUDY

From the reviews of literature on the awareness, use and need of computers, internet and other components of ICT, the following points were revealed which have some implications for the present study.

➢   On the whole, it can be said that majority of the studies are related to the ICT awareness and use of teachers.

➢   Most of the studies are related to computers and Internet.

➢   Most of studies are done in abroad and very few studies are done in India.

➢   Most of the studies were found to be survey type of work.

➢   Most of the studies have tried to come out with the findings in terms of ICT awareness, use and need of teachers.

➢   Questionnaire was used for data collection in most of the studies

➢   Variables taken in most of the studies were gender, experience, designation, qualification, socio-economic status etc.

➢   In most of the studies statistical techniques like frequency, percentage mean, standard deviations, Chi-square, 't' values, ANOVA etc. were used for data analysis.

- Some of studies revealed that 100% ICT awareness of ICT prevailed among the teachers while some other studies revealed moderate or less awareness of teachers about ICT.

- Most of the studies revealed that the use of technology is more among the young teacher in comparison to the old teachers.

- Use of technology was found more among teachers in abroad where as less usage of technologies were found among Indian teachers.

- Very few studies are conducted on ICT need of teacher. From the available studies it was found that a large number of teachers are not using technology because of the lack of skill or the lack of resources.