CHAPTER – II
REVIEW OF RELATED LITERATURE

“A Literature review is usually a highly synthesized critique of the status of knowledge on a carefully defined educational topic.”

(Aggarwal, 2008)

Research can be conducted accurately only if the researcher knows what has been done in that field by others. A good researcher, therefore, makes every effort to dig from and near the states concerned and also the states that need be searched. As such review of related literature in the concerned field is of greater significance. It plays a pivotal role at the crucial juncture of planning the study.

2.0 MEANING OF REVIEW OF RELATED LITERATURE

"A survey of printed material dealing with or bearing on a given subject or problem a summary embodying the finding of such a search"

(Good, 1973)

The phrase "Review of Literature" consists of two words viz. 'Review' and 'Literature'. The term 'Review' Means to organize the knowledge of the specific area of research to evolve an edifice of knowledge to show that the study would be an addition to this field. And the word 'Literature' in research methodology refers to the knowledge of a particular area of investigation of any discipline. Thus, review of related literature Means to locate study and evaluate the past as well as current literature of research concerned with the planned investigation in hand. It is a intellectual pursuit, "essential to the development of the problem and to the deviation of an effective approach to its solution.

2.1 PURPOSE OF REVIEW OF RELATED LITERATURE

Hart (1998) gives the following reasons to review the related literature. It includes:

(i) to distinguish what has been done from what needs to be done,
Review of Related Literature

(ii) to discover important variables relevant to the topic,
(iii) to synthesize and gaining a new perspective,
(iv) to identify relationships between ideas and practices,
(v) to establish the context of the topic or problem,
(vi) to rationalize the significance of the problem
(vii) to understand the structure of the subject,
(viii) to relate ideas and theory to applications,
(ix) to identify the main methodologies and research techniques that have been used, and
(x) to place the research in a historical context to show familiarity with state-of-the-art developments.

Thus, it provides the necessary knowledge and insight to the investigator on what to start, where to start and how to start. So a realistic investigator devotes the maximum time for studying the related studies and researching out the ways to explore his project. This step tells the investigator how much work has been done in a particular field, which methods are used to collect and analyze data, what have been their findings suggested solutions and recommendations etc.

Like other fields, the research worker in the field of education also needs to acquire comprehensive information about what has been done in the particular area in which she/ he intends to take up a problem for research. Having realized the importance of related studies, the investigator tried her best to study the related literature, but due to lack of resources and time, it was, not possible to assess the entire published and unpublished research in the field. Still, an attempt has been made to synthesize the various sources to give a clear picture to the reader regarding a particular field of subject. The sources included research data, empirical studies, journal articles and theoretical frameworks related to Attitude towards ICT, Digital Literacy and Study Process. Google and Google Scholar served as a vital search engines in this process. The findings from the above sources were scrutinized and the studies that had direct or indirect bearing on the present research included year wise under the following heads:
2.2 STUDIES RELATED TO ATTITUDE TOWARDS ICT

Wallance (1999) investigated the relationship between innovativeness, internet use, demographic variables and the attitude of teachers towards the use of internet. Results revealed that there exists a significant positive relationship between increased attitudes towards using the internet and an increase in their internet use. Male teachers had significantly lower internet attitude score than female teachers. This was related to a small group of male math teachers who also exhibited low scores for internet use. It was believed that low internet attitude scores for this group were related to their low levels of internet use.

Howery and Britton (2001) investigated teacher training in technology with its effect on teacher attitude and the use of technology in the classroom throughout the 150- hour training, teachers were provided with the necessary computer skills and knowledge to run applications needed to incorporate technology into the curriculum. The control group did not take part in the technology literacy grant training. Teacher attitudes and use of computers were measured by the computer technology survey. The results suggested that through the training, teachers became more comfortable with the use of technology and their positive attitude towards technology increased. They began to use technology to enhance the learning environment for students.

Jao (2001) developed curriculum instruction Educational Technology to train Pre-service teachers to meet the technology standards and to integrate technology in the classroom. The study was conducted to investigate pre-service teachers’ attitudes and confidence levels towards technology standards. The study revealed that Pre-service teachers had more positive attitudes towards educational technology. Pre-service teachers had an increase of confidence level in performing the surveyed skills and in teaching them at the grade levels they planned to teach.

Wilson (2001) surveyed university faculty to determine the strengths, barriers, attitudes and uses of instructional technology and to ascertain relationships between attitude and use. Independent variables were age, gender, highest degree earned, years teaching in higher education, area and students taught (graduates/ undergraduates). Dependent variables were attitude and use.
Multiple linear regression was used to determine whether selected variables could predict attitude and use. No significant relationships were found between attitude or use and degree, years teaching or student classification. No significant difference was found between attitude and college. Neither age nor gender predicted attitudes toward or use of instructional technology.

Arkin (2003) conducted a study to examine how teachers perceive the incorporation and use of computer technology resources in language teaching through investigation of teachers’ attitudes and approaches to using an online supplementary resource in vocabulary instruction in an EFL context. The study was aimed to explore the factors that affect teachers’ use or non-use of the online program for teaching purposes. The data was collected through questionnaires. 97 teachers in an English-medium university were selected for data collection. Based on the results of the questionnaires, a stratified sample of 12 teachers was selected for follow-up interviews. The results revealed there were statistically significant differences between the teachers who have undergone computer technology training and those who have 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 is seen as a key factor in both changing attitudes and encouraging teachers in incorporating technology into their instruction.

Njagi, Smith and Isbell (2003) assessed the relationship between computer literacy, gender, time student spent on the internet and attitude towards computer technology. The sample of 127 university students was taken. Results indicated a positive significant relationship between computer literacy and attitude towards computer technology. Males were found to have a better attitude to computer technology. Neither owning a personal computer nor having internet accessibility at their current residence was a predictor of attitude towards
Review of Related Literature

computer technology and time spent on internet was found to predict attitude toward computer technology.

Albirini (2004) investigated the attitudes of high school EFL teachers in Syria toward ICT. In addition, the study investigated the relationship between computer attitudes and five independent variables: computer attributes, cultural perceptions, computer competence, computer access, and personal characteristics (including computer training background). The study explored that teachers had positive attitudes toward ICT in education but they were relatively neutral about the cultural relevance of ICT to Syrian society and schools. The findings of the study indicated a very strong positive correlation between teachers’ attitudes toward ICT in education and their perceptions of computer attributes.

Galanouli, Murphy and Gardner (2004) conducted a study on teachers’ perceptions of the effectiveness of ICT competence training i.e. NOF training for all UK teachers. In this research, a sample of 900 teachers from primary and secondary schools in Northern Ireland was surveyed and yielded over 450 responses. Results revealed that NOF training had a measure of success in increasing teacher’s confidence in using computers in their teaching but that had been tempered by a considerable degree of negative reaction to form and content of the training. Overall, 109 teachers expressed negative attitudes to NOF training. Further the analysis of these negative attitudes led to the identification of number of issues that appeared to affect the respondents’ attitudes. The six items were listed to represent the most frequently occurring sentiments in the responses. Most notable was the lack of time given over to it, the exploitation of teachers’ own time and expense and the lack of technical and social support, and good equipment and resources.

Gamlepsi (2004) surveyed 150 English teachers to determine their attitude towards the use of educational technology in their classes. The findings implied that the teachers think that there is a relation between class and technology use. The teachers stressed that education technology has an important place in teaching learning process but they were not so willing in using educational technology in their classes.
Dey, Saxena and Gihar (2005) conducted a study on ICT and teacher educators to study the use of ICT in teacher training institutions by the teacher educators during their teaching. Results revealed that eighty percent teacher educators were found not using educational technologies. 70% to 90% teacher educators did use internet, tape recorder, computer and slide projector during teaching their classes.

Subbaiah (2005) investigated the application of ICT in English language Teacher Education. It was found that sixty six percent of teacher educators did not know the basic principles of computer. Attitude of teachers educators towards ICT was quite positive. The focus of computer equipment problem had both quantity problem as well as quality problem.

Rajorgi and Charalambous (2006) set out a study to measure the perceptions of Pre-primary and primary school, teachers in Cyprus regarding the impact and efficiency of a particular ICT In-service training initiative. The results revealed that there was a significant impact of such training on teachers’ personal attitudes and skills. Teachers’ views on the efficiency of the training scheme highlighted the need for a more flexible training structure to tailor individual needs and for professional development activities to become more relevant, to the context of classroom practices.

Mehra (2007) assessed the teachers’ attitudes towards computer use. It was conducted on 200 Government Senior Secondary School Teachers. The exploratory survey method was used and 20 schools were randomly chosen. A questionnaire developed by Albrini was used for data collection. The percentages were computed to get an idea about the perceptions of school teachers towards knowledge about computers and their attitudes towards computer use. The results revealed teachers possessed fairly positive attitudes towards computer use and they feel that computers should be used for making teaching and learning more effective, but majority of the teachers do not possess the required computer competencies. So, lack of computer competence and access is a major barrier to acceptance and adoption of computers by teachers, So, teachers need to be trained in using computers and they should be available to them at schools.
Teo (2008) examined the attitudes of pre-service teachers towards the use of computers. A sample of 139 pre-service teachers was assessed for their computer attitudes using a Likert type questionnaire with four factors: affect (liking), perceived usefulness, perceived control, and behavioral intention to use the computer. The results of this study revealed that the participants showed positive attitudes towards the computer and the overall positive level of computer attitudes could be attributed to the availability and accessibility to computers given to the pre-service teachers at various stages of their education. The results of this study also showed that there were no gender or age differences among pre-service teachers on computer attitudes. However, there were significant differences for computer attitudes by the subject areas that pre-service teachers had been trained during their university education: Humanities, Sciences, Languages and General (Primary). Correlation analyses revealed significant associations between years of computer use and level of confidence, and computer attitudes.

Cavas, Cavas, Karaoglam and Kisla (2009) carried out a study to reveal Turkish primary science teachers’ attitudes toward ICT in education and then explore the relationship between teachers’ attitudes and factors which are related to teachers’ personal characteristics (gender, age, computer ownership at home, and computer experience). In order to collect data, an instrument (STATICITE) was developed by researchers and administered to 1071 science teachers. The results indicate that Turkish science teachers had 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. The results of the study showed that almost half of the Turkish science teachers used computers in their courses and they had high levels of computer access, especially in their school and at their homes.

Husain (2010) conducted a study to identify the competencies needed by teachers for development and implementation of ICT based education. A rating scale consisted of 47 items was used which was based on four types of teacher competencies namely- Technological ICT competencies, pedagogical ICT competencies, didactical ICT competencies and social ICT competencies. This
tool was administered on 73 teacher educators and data was analyzed by using frequencies and percentage. The result revealed that all the teacher educators were agree that the ICT competencies which teachers need to develop are; (i) Use of ICT skills in developing and presenting information, (ii) Prepare ICT-based learning environment, designing effective learning experiences and creating rich learning environments with the support of ICT and understanding of computer technology can enhance student learning (iii) Using ICT as a didactical tool implies using it to establish dynamic and powerful instructional strategies and environment and (iv) Demonstrating knowledge and skills for using technology in ethical, legal and safe ways and to use humour and good manners during the teaching and learning process.

Zhou, Zhao, Hu, Liu and Xing (2010) investigated the attitudes of pre-service chemistry teachers’ attitude toward ICT and the relationship of teachers’ attitudes to a selected set of independent variables. The results revealed that participants had positive attitudes toward ICT in education and their positive attitudes were evident within the affective, cognitive and behavioral domains. The teachers seemed to have totally agreed for introducing ICT into schools and the majority of teachers also considered computers as a viable educational tool that has the potential to bring about different improvements to their schools and classrooms. In fact, the behavioral subscale of the computer attitude scale showed that the majority of teachers had the intention to learn about computers and to use them in the near future. The findings of the study indicated a very strong positive correlation between teachers’ attitudes toward ICT in education and their perceptions of computer attributes. It was significantly related to computer attributes, culture perception, but it was no significantly related to computer competence. An examination of individual computer attributes shows that respondents were most positive about the observability of computers. However, teachers’ perceptions of the complexity of ICT with their current teaching practices were not as positive. The majority of them did not agree that ICT will simplify the teaching task in the classroom. ICT competence was the second most important predictor of computer attitudes in this study. ICT competence are fine in general, the degree is in between the little competence and moderate
Review of Related Literature

competence. including software installation, printer usage, keyboard usage and virus removal, etc.

**Giavrimis, Giossi and Papastamatis (2011)** stated why teachers participate in Information and Communication Technology (ICT) programmes, what their sociological approaches are, and where they focus their attention in order to achieve the objectives of their training in these new technologies. The data of this research was collected from 162 teachers who were working in primary schools in Northern Greece. There were 70 (43.2%) men and 92 (56.8%) women. The results showed that one of the main reasons for primary school teachers’ participation in ICT programmes was their interest in exploring ICT, in both their teaching and in their personal lives. They considered lifelong education as necessary to the practice of teaching and useful in settling educational inequalities, while at the same time they thought that in-service education should be in accordance with the requirements of the modern social-cultural environment.

**Sivakumaren, Jeyaprakash, Gopalakrishnan and Geetha (2011)** studied the various attitudes of library professionals on ICT in the libraries. The questionnaire method was used to collect data from the respondents working in universities and colleges. The data were collected from 55 respondents out of 71 respondents. These 55 respondents were grouped into three categories based on designation, experience, gender and qualifications. Thirteen attitudes of library professionals on ICT were identified. These were further ascertained on three point Likert scaling system such as No Opinion, Disagree and Agree. The study revealed that the majority of library professionals had positive attitude on ICT and some of them were not able to update their knowledge and skills on ICT. The library professionals showed positive attitudes towards implementation of ICT in the libraries. Most importantly, the library professionals were interested to learn more about the development in the ICT Technologies.

**Kizil (2011)** investigated the ICT usage and the attitudes of high school EFL teachers in Turkey towards ICT. This study also focused on the relationship between computer attitudes and extension of ICT usage, computer attributes and personal characteristics. The data was gathered through a questionnaire from 76
in-service EFL teachers working at state schools. Analysis was done by using descriptive statistics and Pearson Correlations. The results of the study revealed that the most widely used ICT tools are grade-book, internet, software for repetitive practice, processing texts, interactive exercises and PowerPoint presentations. It was also found that EFL teachers hold positive attitudes towards the use of ICT for educational purposes and regard computers as advantageous over traditional methods of instruction and suitable for their curriculum goals.

**Krishankumar and Rajeshkumar (2011)** studied the attitude of teachers of higher education towards e-learning. The sample was selected from the higher educational institutions where there was facility for e-learning. The 255 teachers were selected on the basis of purposive sampling. Two way Analysis of variance was used for data analysis. The findings of this study revealed that the teachers had a favorable attitude towards e-learning as well teachers who were familiar about computer and information and communication technology differ in their attitude towards e-learning when compared to the teachers who were not familiar with technology. There existed no significant Mean difference in the attitude towards e-learning with respect to the variables e-mail id, courses attended in computers and net access, the t-value of the corresponding Mean differences was computed to be 0.53, 0.19 and 1.11 respectively and all were not significant at 0.05 level for the df 253. It was therefore concluded that there are no significant Mean difference in attitude towards e-learning based on the variables e-mail id, courses attended in computer and net access facility. Teachers who possessed knowledge about computer were having favourable attitude towards e-learning and teachers having blogs differed significantly in their attitude towards e-learning from those who did not have blogs.

**Elsadani (2012)** conducted a study to understand weather gender is a factor that should be considered when considering teaching staff’ attitude toward Information and Communication Technology (ICT). The survey method was used to collect the data and it was gathered through the questionnaire. The survey domain is a random sampling of teaching staff in Egyptian higher education institutions. The population for this study was 500 full-time teaching staff but only 412 returned and complete questionnaires were considered as the study
sample. The results showed that there was no significant difference between male and female teaching staff in Egyptians higher education institutes regarding their attitudes towards ICT. Thus, gender was not a significant factor when considering attitude toward ICT by teaching staff members in Egyptians higher education institutes. The result of this research has significant implications to higher education institutes. when they plan, develop, and adopt ICT. So, higher education institutes has to consider that teaching staff attitude toward ICT is not related to their gender.

Mahat, Jamsandekar and Nalavade (2012) 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. The results of this study indicated that there was a high and negative correlation between teachers attitude towards ICT teaching and teaching time in the class. It can be said that, ICT reduces time required for teaching. The highly positive correlation between the attitude toward ICT teaching in the class and student engagement in the class showed that, the ICT will increase the student engagement in the class. 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. In this new era, educational systems seek to prepare teachers and students for the work force and computer literacy becomes vital in higher education. This is especially important for the Faculty of Computer Sciences.

Rana (2012) conducted a study to assess the teacher educators' attitudes towards technology integration in classrooms. 21 teacher educators from a teacher education college of north India were selected for the sample through cluster sampling procedure. The data were collected with the help of a Teacher Educators' Attitude towards ICT Scale containing 40 items. The results showed that most of the teacher educators had positive attitudes towards the general role that information and communication technology can play in education and in the educational process. The findings also revealed that no gender differences existed.
on attitudes towards ICT in teacher training. Further analysis shaded light on
differences in attitudes with respect to age. It revealed significant difference in
attitude towards technology with respect to age of teacher educators. Younger age
group scored lower than the middle age group. However, no significant
differences emerged among younger and older; middle and older age groups. The
results showed that in general, all the teacher educators were in favour of using
technology. This positive attitude is an important indicator of willingness and
first step ineffective integration.

**Suri and Sharma (2013)** carried out a study which aimed to understand
the relationship between gender and attitude towards e-learning. They also
analyzed the impact of gender on the usage of the basic e-learning forms like
uploading/downloading course content, interactive videos and pod casting. Scale
on Computer and e-learning attitude (SCAELA) was constructed and validated.
In this study 477 students enrolled in various courses across many departments in
Punjab University Chandigarh were analyzed. The data analysis was undertaken
using statistical approach i.e. independent sample t-test and one-way ANOVA.
The results showed that no significant relationship existed between gender and
attitude towards computer and e-learning. The usage of various e-learning forms
also showed a non-significant relationship with gender. The results also showed
that students of Punjab University were well versed with the latest tools and
forms of e-learning and had high rate of access to internet. The various forms of
e-learning were known to the students of university.

**Victor (2013)** carried out a study to focus on the level of attitude towards
ICT among B. Ed teacher trainees. 16 colleges of education were selected by
using proportionate random sampling technique for the study. Out of these 16
colleges, 15 colleges were from urban and 1 college was from rural background,
which included aided and self-financing institutions. The sample of teacher
trainees comprise of 952 teacher trainees among them 496 were male and 456
female. Personal data sheet and Attitude towards ICT Scale developed by
investigator were used for data collection. The results indicated that majority of
teacher trainees (60.5%) showed uncertainty in their attitude and only 39.5% of
the trainees showed positive attitude towards ICT. Further irrespective of gender
and Locale the attitude towards ICT of teacher trainees were at the same level. The study suggests that Crash courses especially in ICT applications and Workshops on modern ICT tools could be conducted to make the teacher trainees aware of the different innovative techniques and methods.

2.3 STUDIES RELATED TO DIGITAL LITERACY

Markauskaite (2007) conducted a study to describe the nature of trainee teachers' ICT literacy at the beginning of pre-service training: (a) to explore the structure and to identify the main components of ICT related capabilities, and (b) to examine possible relationships between these components. Data from trainee teachers' ICT literacy self-assessment survey were examined using exploratory and confirmatory factor analysis. Two elements of ICT-related general cognitive capabilities and three elements of technical capabilities were identified, respectively: (a) problem solving, (b) communication and meta-cognition, (c) basic ICT capabilities, (d) analysis and production with ICT, (e) information and Internet-related capabilities. It was found that general cognitive and technical capabilities are two separate areas of ICT literacy; however basic ICT capabilities are an important component of both areas. The results showed that the trainee teachers were the most confident about their interpersonal capabilities, "To collaborate and communicate with various people in a variety of contexts" (M = 4.02, SD = 0.79), whereas they were the least confident about their planning capabilities. Students' confidence about all other general cognitive capabilities was quite similar and the Mean scores ranged between 3.39 (SD = 0.96) and 3.56 (SD = 0.76).

Tella and Mutula (2008) carried out a study to determine gender differences among undergraduate students across all disciplines with regard to computer literacy at the University of Botswana. The sample of 500 students was collected of which 300 were females while 200 were males. Purposive sampling was used to select respondents from the six faculties of the University which consisted of thirty nine departments. A survey questionnaire was administered to them and collected after its completion. Descriptive statistics and t-test were employed for the analysis of the data. The results revealed that there was gender differences existed between female and male undergraduate students at the
University of Botswana with regard to computer literacy. The results indicated that the male students were more computer literate and had more computer experience than their female counterpart. The findings further revealed that students with higher computer literacy were more inclined to access and make use of library facilities. Moreover, there was difference between the respondents’ computer usage and software application.

**Senapaty (2009)** studied integrating information and communication technology with constructive pedagogy for the professional development of teachers. He concluded that it is learning with, not from or about technology that makes computer based technology an important tool in a constructive learning environment. The professional development that allows teachers to construct professional knowledge about pedagogy, content and technology as well as strategies for managing the changing classroom environment. The technology competent and constructive teacher can use literacy skills and cognitive terminology such as, classify, analyze, predict and create and can also help students to respond to the digital world with creative and constructive learning.

**Konan (2010)** studied the Computer literacy levels of teachers which is a need for teachers especially in both reaching information and making the process of learning and teaching more effective. With this aim in mind, the researcher developed an inventory and administered to 506 teachers in Malatya, Turkey, in the 2008-2009 academic years. The results were analyzed using t-test and one-way analysis of variance. At the end of gender variance analysis, there was significant difference between the opinions of female and male participants, in favor of males. perceptions of participants regarding computer skills vary significantly in terms of total teaching experience. According to Mean scores of the groups, teachers with two-year degree (two-year associate degree) feel that they are less skillful than teachers with undergraduate and graduate degrees, whereas teachers complementary undergraduate see themselves less skillful than teachers with graduate degree. So, significant difference was found between the levels of male teachers and female ones, and teachers with high teaching experience and those with low teaching experience, and also teachers with high education level and those with low education level.
**Review of Related Literature**

Singh (2011) analyzed that in the present world a teacher cannot visualize the educational process and cannot achieve the goals of quality education without getting mastery in the digital technology. Digital technology has both an instrumental and cultural dimension and a teacher needs to understand and master both. To succeed, there is a need to work with multiple dimensions that can motivate teachers to use ICT. A number of technology tools are available in the educational institutions like computer, LCD and other hardware, but the more attention needs to be given to the capacity building of the teachers in technology.

Son, Robb and Charismiadji (2011) conducted a study, which examined the current level of computer literacy of a group of Indonesian teachers of English as a foreign language (EFL) and investigated factors affecting their use of computers in classrooms. Participants in the study were 73 in-service teachers of EFL at Indonesian schools and universities. A computer literacy questionnaire was employed to collect the data and teachers were invited to respond to this questionnaire containing questions related to the teachers’ ownership and accessibility of computers, their level of ability to perform computer-based tasks, their personal and professional use of computers and their interest in computer-assisted language learning (CALL). The findings of the study revealed a picture of the Indonesian teachers’ use of computers in their local contexts and recommend increasing the teachers’ online opportunities, skills and competencies in the use of computers for their teaching practices and professional development. Overall, the teachers’ attitudes toward the use of computers were highly positive.

Taylor, Goede and Steyn (2011) conducted a study to explore the factors influencing the success of the learning of computer literacy by means of an e-learning environment. The research question for this paper was what is the relationship between the success of the teaching of computer literacy and factors such as mother tongue, the learner’s favourite subject, secondary school, race, future vision, confidence, computer anxiety, prior knowledge, intellectual ability, learning styles, the learner’s ability to plan and follow his or her own planning and gender? The results revealed a model representing critical success factors. According to the study, the learners’ results in their final school year made the biggest contribution to the success, a factor which is followed by their prior
knowledge of computers, gender, future vision of computer use, computer anxiety and preference for mathematical subjects.

Wit, Heerwegh and Verhoeven (2011) analyzed the changes in the basic ICT skills of graduate students between the years 2005 to 2009. For this purpose two online questionnaires were used to compare the students’ opinions and behavior between 2005 and 2009. In the year 2005, sample of 714 students was taken who respondent to these two online questionnaires and in the year 2009 second sample consisted of 1529 students. The main variables of the Technology Acceptance Model were used as predictors to explore the possible changes between 2005 and 2009 in the mastering of 19 ICT skills, and the frequency of the use of computers for six different tasks. The results of the study revealed that the students became more proficient in some ICT skills, while proficiency in other skills did not change. Overall, the level of 12 of the 19 ICT skills changed significantly between 2005 and 2009. Nine ICT competence levels increased significantly, with the most marked increases being in the areas of preparing a power point presentation and bookmarking web pages. Remarkably, three ICT skills seem to have decreased over the years. Two of these were spell checking and using a search engine already had very high scores in 2005, meaning that the decrease could simply be the result of a ceiling effect. Gender was an important factor to predict ICT skills and the frequency of using computers. But it was shown that for some skills female students had caught up with their male counterparts.

Gruszczynska, Merchant and Pountney (2013) studied the findings of a project "Digital Futures in Teacher Education" which was a part of the third phase of the Joint Information Systems Committee (JISC) UK Open Educational Resources (OER) programme. It addressed to the attempts of OER practice within the teacher education programmes, and which had informed practice in teaching and learning in the school system involving digital literacy. A framework for digital literacy was outlined, drawing heavily on socio-cultural models of digital practice. It had the potential to re-imagine teachers and teaching, as well as learners and learning and which, at the same time, addressed reasons and process of implementation of digital literacy. This framework took into account current debates focusing on issues of ICT, digital literacy and media
literacy in the curriculum, which reflect a tension between digital literacy as a set of skills and competencies on the one hand and understandings that arise from socio cultural and communicative practices on the other. Current understandings of digital literacy in the context of teacher education and OERs were explored and the potential for digital literacies was examined. This drew on the data collected in the context of the DeFT project and included the meanings and perspectives on digital literacies as expressed by project participants. The effectiveness of a methodology was examined including a range of voices, including children's voices, in the Meaning-making process and recommendations on the basis of the findings were made. One key outcome was the preparation of new teacher training courses in digital literacy and the use of OER for learning and teaching in formal and informal settings. In terms of a digital future for teacher education the paper highlighted the need for practices, learning packages and tools to continue to evolve, in close cooperation with their potential users, and linked directly to classroom and schools as the site of this production.

**Ogundele and Etejere (2013)** investigated the relationship between computer literacy and teacher’s job effectiveness of secondary schools in Kwara State, Nigeria. The study was a correlation survey. Stratified random sampling technique was used to select 1800 respondents. The data obtained were analyzed using Pearson Product Moment Correlation statistic and t-test statistics and tested at .05 level of significance. The findings revealed that computer literacy encourages appreciation and utilization of computers during teaching learning processes which invariably aid teachers’ job effectiveness, such as job performance, record keeping, school discipline, and supports students’ academic performance. It also revealed that computer literate teachers perform better in the schools than non-computer literate teachers in the schools by making use of computers during their teaching, the use of computers arouse students’ interest in the teachings which supports effective student academic performance. Those schools with non-computer literate teachers were never exposed to computers’ usage which detracted from effective teaching and learning in the schools.
2.4 STUDIES RELATED TO STUDY PROCESS

Falvo (1999) conducted a qualitative study to explore the day to day classroom work of teachers, highlighting the integration of technology into learning and showing how these teachers builds and refines relationships to foster their sense of professionalism through the use of technology. The results revealed how teachers use the internet as an instructional resource and as a tool for connecting to other people within and outside of the learning community. The participants of this study learnt new technology skills and integrated internet technology into their daily teaching and planning of lessons. This study provided insight into the advantages of using technology to support instruction to build a functional educational community and to enhance the teaching profession. Teachers believed that their instruction changed when they developed technology skills primarily internet skills, through their participation in an extensive training program.

Redmann, Kotrlik and Douglas (2002) conducted the study which addressed how technology was being integrated in the teaching and learning process in secondary marketing education programs for four distinct and independent phases: Exploration, Experimentation, Adoption, and Advanced Integration. The study was based on the Kotrlik/Redmann Technology Integration Model. The phases in which marketing teachers were most active were exploration of the potential of using technology in the teaching and learning process, and adopting technology for regular use in instruction. They were functioning at a fairly strong level in both phases. They were not very active in the experimentation phase, but were operating at a moderate level in the advanced integration phase. Teachers perceived that minor barriers exist that prevent them from integrating technology into the teaching and learning process and they also perceived they are good teachers. Marketing teachers were not experiencing anxiety when attempting to integrate technology into the teaching and learning process.

Donson (2005) investigated in his study that there was no relationship between teacher’s years of experience in the classroom and teachers perceived levels of technology integration in the classroom. The level of technology
integration of teachers affects level of integration. There was the relationship
between teachers’ skill levels and their level of integration, in that the higher the
skill level was, the more the teacher integrated technology.

Dash (2007) stated that ICT is an important instrument that can transfer
the present isolated, teacher centered and book centered learning environment
into a student centered environment, he found that ICT can change the traditional
concept of learning process. He has supported to integrate ICT in curriculum of
Teacher Education so as to prepare teacher for future. He stated that in context of
ICT professional development of teachers includes the transactional strategies,
access to technology, time and support, ongoing development and training
through small groups and variety of options. But for all this teacher must have
that level of readiness to integrate technology into curriculum.

Drent and Meelissen (2007) discussed the factors which stimulate or
limit the innovative use of ICT by teacher educators in the Netherlands. Results
showed that several factors on teacher level influence the implementation of
innovative ICT use in education Especially, teachers who are so-called ‘personal
entrepreneurs’ are important for the integration of ICT in teacher education.
School level factors turn out to be of limited importance for innovative use of
ICT.

Abraham and Sharma (2010) stated that teacher in India need to face
the challenges of 21st century for impairing new age education the and stressed
that teacher education programme in India should integrate ICT components in
such a way that teachers, are enabled to faced the new demands in this noble
profession. With use of ICT a basic transformation is taking place in the way our
teachers teach and students learn. They emphasized that the components of ICT
should integrate in the teacher education programmes in such way that can be
used for updating information, for developing teaching competence, for sharing
instructional material, for developing research competencies and for enriching
teacher education curriculum.

Li and Ni (2010) set out a study to investigate how Chinese elementary
in-service teachers use new technologies in instruction, their beliefs toward
technology, and the kind of support that they receive in using technology. A
survey method was used to collect the data from a sample of 507 elementary in-service teachers and 2501 students in Shanghai, China. The results revealed that the in-service teachers held positive attitudes about the benefits of technology for teaching and learning and they routinely used a variety of common computer applications in instruction. However, inconsistent with their beliefs, their technology use was limited to teacher-centered purposes, rather than student-centered activities. The findings also indicated that there was a strong correlation among teachers’ attitudes toward technology, their frequency of using technology, and technological supports from school district. These findings suggested that the needs for Chinese in-service teachers are not functional computer skills, but more professional development in instructional design skills in technology integration that promote student-centered practices.

Sibichen and Annaraja (2010) conducted a study to analyze whether the teacher trainees’ computer competence Teacher’s use of technology enhances their technology use in classroom teaching or not. Teachers’ use of technology has an important role in education in the present century as technology can provide the powerful environments eliciting modern views of learning, but may not change teachers’ beliefs and practices. Rather, it depends on how teachers interpret the uses of technology tools and how they use them to transform the learning process. For the study the researchers used stratified random sampling techniques for selecting the sample. The sample was 75 secondary teacher education students in which 37 were male and 38 were female. Mean, SD, t-test and ANOVA and chi square were used for the analysis. The results revealed that there was significant difference between secondary teacher education students who have attended computer course and who have not attended computer course in their skill in learning, evaluation and techno pedagogical skills. Teacher trainees’ competency in computer usage helps them to improve their techno-pedagogical skills in the classroom. While comparing the Mean scores of secondary teacher education students who have attended computer course and who have not attended computer course in their skill in learning, secondary teacher education students who have attended computer course were better than their counterparts.
Tezci (2010) studied teachers’ influence in the use of Information and Communication Technologies (ICT) at schools. He examined various variables such as the years of experience of teachers, their gender, the duration of computer and Internet use, attitude of teachers, their level of knowledge and their frequency of ICT use. The data for the study comprised 1540 primary school teachers, of whom 844 (55%) were female and 696 (45%) were male. For data collection Knowledge, Use and Attitude Scales of ICT were used. The results showed that 83.7% (1289) of the teachers had previously received a computer course. Distribution of teaching experience was 1-5 years for 32%, 6-10 years for 25.4%, 11-20 years for 22%, and 21 years and more for 20.6%. The daily computer usage of teachers was almost never for 9.7%, 1-2 hours for 66%, 3-4 hours for 18%, 5-7 hours for 3.7%, and 8-10 hours for 6.2%. Computer use ranged from 0 to 10 hours daily (M=2.23, SD=.77). The daily Internet usage of teachers was almost never for 11.6%, 1-2 hours for 69.6%, 3-4 hours for 13.6%, and 5-7 hours for 5.2%. The rate of teachers with personal computers was 89.2% (1373). Locations of Internet access for teachers were home for 45.5%, school for 21.2%, both for 19.9%, Internet cafe for 8.7%, and other for 4.7%. So, these results revealed that the most commonly used and well-known ICT types among teachers were the Internet, e-mail and word processing, and teachers’ attitudes towards computers and the Internet were generally positive. It was also found that their attitudes vary with their years of experience and levels of knowledge.

Swamy (2012) carried out a study to find out the status of ICT use in the teacher education institutions and how the institutions were using ICT for the students to increase their efficiency to build the digital society, which helped in producing ICT expert teachers. In this research questionnaire survey was conducted to identify the status of use of ICT in the educational institutions from Thiruvananthapuram district in Kerala. Structured questionnaire were formulated in order to identify different uses of ICT and the efficiency of using the ICT. The sample of 100 students from 5 selected colleges from natural science and social science branches was taken. The respondents were students of BEd. course. Random sampling method was adopted for the survey. The results showed that only 2 colleges had ICT infrastructure to support teaching and learning. All of them had electricity and telephone accesses. However, the surveyed institutions
Review of Related Literature

had computing resources to support administrative purposes, but computers to conduct in-service training to develop ICT skills in students were insufficient. The results also revealed that more than 50% of the students explore the web for learning. But there was absence of online assessments. Most of the respondents collected data for studying from the Internet. But there was no facility in their institution for online assessment. Web browsing was found common among all the respondents. All the respondents depend on web pages for updating their knowledge. There was not any internal interaction among teachers, students, or among teachers and students using email.

2.5 CONCLUSION

From the review of above studies, it was found that a few studies have been conducted on the outcomes of technology training programs. Moreover, no study is available in Indian conditions concerning the effect of Intel Teach Program on attitude towards ICT, Digital Literacy and Study Process of teacher educators of Haryana. To fill this vacuum, the present study was undertaken to find out the effectiveness of Intel Teach Program on Attitude towards ICT, Digital Literacy and Study Process.