CHAPTER -II
REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

According to Dewey, the review of related studies is said to be third step of scientific method. These studies help to avoid the risk of duplication. It helps the investigation to see whatever the evidence already available shows the problem adequately without further investigation and thus to avoid the risk of duplication. Every investigator is expected to know what sources are available in his field of enquiry. Which of them he/she is teaching to use and find them.

The investigator studied various educational journals books, articles and research studies published in India and abroad related to this study.

Good, Barr and Scates highlighted the importance of related literature.

- To provide ideas, theories, explanations or hypothesis valuable in formulating the problem
- To suggest methods of research appropriate to the problem
- To avoid the risk of duplicating the same study already undertaken.
- To locate comparative data useful in the interpretations of results.
- To contribute to the general scholarship of the investigator.

For any worthwhile study in the field of educational research, one of the prerequisites is to make a survey of the studies undertaken earlier relating to the topic, now under study. Availability of adequate information enables the investigator to know precisely the types of researches that have already been done by others relating to the topic.
2.2 STUDIES RELATED TO ATTITUDE TOWARDS ICT

Murphy and Colette (2000) analysed the Effective Use of ICT by Student Teachers-Is It Improving?. Effective use of ICT (Information and Communications Technologies) by student teachers is vital if these technologies are going to be successfully used in the education of children in schools. This paper presents a comparative study of the ICT competence and attitudes of a similar cohort of student teachers in the 1999/2000 academic year, attending a one-year Postgraduate Certificate in Education course to teach in United Kingdom secondary schools. It argues that, while the overall sample of 1999/2000 student teachers appeared to be more competent and confident in the use of ICT than in 1996/97, female and younger students lagged behind their male and older peers. This issue needs to be addressed in the ICT policy adopted by initial teacher training providers.

Joy, B.H.H. and Manickam, L.S.S. (2002) conducted a study on “Computer Assisted Instruction: Attitude of Teachers and correlates”. The objectives of the study are (i) To assess the knowledge in computer, attitude to computer Assisted Instruction and teacher competency of Science teacher and (ii) To assess the effect of training on these variables. The findings of the study are (i) There is no significant difference on the teacher competency in the pre and post scores or between the experimental and control group. But teacher competency is positively related to post knowledge in CAI of the experimental group. (ii) There is a significant difference between the groups in their attitude towards computer education. As a result of training in Computer Assisted Instruction (CAI), the
attitude of the experimental group become more favorable towards computer education. (iii) There is correlation between age and attitude towards use of computer. (iv) There is significant difference in the pre and post scores of the experimental group on knowledge in CAI and attitude towards use of computer.

**Clarkson, Barney, Oliver and Ron. (2002)** made a study on A Typology for Identifying Teachers' Progress in ICT Uptake. The instrument takes the form of a typology matrix comprising four stages in ICT uptake across a continuum describing teachers' levels of dependence. Identification of teachers' positions in the typology matrix is determined by their affective, cognitive and demonstrated states of ICT application and use. The paper describes the process of determining the position of two elementary school teachers within the typology and discusses the reliability and validity of the instrument and the placement process.

**Demetriadis, S. et al. (2003)** conducted a study on "Cultures in Negotiation": Teachers' Acceptance/Resistance Attitudes Considering the Infusion of Technology into Schools, Data resulting from this project indicate that although teachers express considerable interest in learning how to use technology they need consistent support and extensive training in order to consider themselves able for integrating it into their instructional practice. Teachers are interested in using ICT (1) to attain a better professional profile, and (2) to take advantage of any possible learning benefits offered by ICT but always in the context of the school culture. They are willing to explore open and communicative modes of ICT-based teaching whenever school objectives permit, otherwise they appear to cautiously adapt the use of ICT to the traditional teacher-centered mode of teaching (strongly
connected to the established student examination system). Teachers' attitude to adapt ICT mode of use is supported by research evidence that emphasize the situational character of knowledge and expertise. Authors discuss the view that introducing ICT into schools can be understood as initiating a "negotiation" process between cultures and the way that technological tools are used reflects school "single context" epistemological stance.

**Dirckinck-Holmfeld, Lone, Lorentsen and Annette. (2003)** examined the Transforming University Practice through ICT-Integrated Perspectives on Organizational, Technological, and Pedagogical Change. The article focuses on the use of information and communication technology (ICT) for strengthening and transforming university practice in line with the social and technological conditions of the new ideas for "interactive" universities. The purpose is to use ICT as a change-agent in order to establish new practices--new pedagogical methods, new methods for collaboration and new forms of interplay between physical and virtual learning environments. The article is based on an ongoing case in which both the authors have been engaged: the IT Innovation project (ITI) and E-learning Lab North Jutland (ELL) at Aalborg University in Denmark. The article presents the different initiatives and strategies for innovation of the university and subsequently discusses the work in the perspective of organizational learning and planning theory.

**Lim, Cher Ping., Pek, Meow Sien., Chai, and Ching Sing. (2005)** made a study on Classroom Management Issues in Information and Communication Technology (ICT)-Mediated Learning Environments: Back to the Basics. Research
studies have shown that effective classroom management is a necessary condition for successful ICT integration in schools. Drawing upon the classroom management practices of teachers in a Singapore primary school, this article describes how the elements of classroom management facilitate the creation of a conducive learning environment to engage students in their learning with computers. Observations of ICT-mediated lessons, interviews with teachers, and focus group discussions with students are used in the case study. The classroom management elements that are identified and discussed include supporting ICT and non-ICT tools for the ICT-mediated activities, establishment of disciplinary and educational rules and procedures, and division of labor among teachers, students and technical support staff.

Selwood, Ian., Pilkington, and Rachel. (2005) reported the Teacher Workload: Using ICT to Release Time to Teach. Teacher workload has been a recurrent concern in education in England and Wales for a number of years. One possible solution that has been put forward is the greater use of information and communications technology (ICT). In the spring of 2002, the Department for Education and Skills (DfES) launched a 1-year initiative called the Transforming School Workforce (TSW) Pathfinder Project, and this was evaluated by a team from the University of Birmingham. One of the ways of reducing teachers' workload envisaged by the DfES was increased use of ICT. The data presented in this article come from the aforementioned evaluation and concerns teachers changing perceptions of, access to, issues relating to training in, and use of ICT, and their beliefs concerning the use of ICT. Overall, teachers believed the TSW
Project helped to reduce workload, making them more productive as teachers. Changes likely to have contributed to this included: far greater access to ICT facilities both in terms of hardware at home, and sole access at school; increased daily use of ICT by teachers; an increase in teachers' confidence in the use of ICT and changes in teachers' views on the quality of ICT training.

**Barton, R., and Haydn, T. (2006)** reported the Trainee Teachers' Views on What Helps Them to Use Information and Communication Technology Effectively in Their Subject Teaching. The research focused on trainees' reflections on their experiences of trying to "get better" at information and communication technology (ICT) in the course of their training. Data collection involved baseline and follow-up questionnaire surveys of trainees' attitudes to the use of ICT in subject teaching and the factors that they felt had hindered or promoted their development in the use of ICT, and focus group interviews with small groups of trainees. In spite of the importance attached to this facet of initial training, and significant investment in terms of time and training materials and resources, there is evidence to suggest that much of this investment is not found to be helpful by trainees. In particular, there appears to be a danger that they have simply been overwhelmed with information about the use of ICT to such an extent that they do not feel that they can realistically be expected to engage with many of the materials that have been produced. In addition to ascertaining trainees' views on strategies and interventions that they did not find helpful, the data identify some key factors and moments that trainees felt had a major impact on their progress in the use of ICT. The outcomes of the enquiry reveal clear preferences among trainees for modes of working with
ICT, and in terms of the experiences that they felt had impacted on their ability to use ICT in their subject teaching. The concluding section of the paper considers the ways in which trainees' induction into the use of new technology might be made more effective.

Jegede, Philip Olu., Dibu-Ojerinde, Odusola Olutoyin., and Ilori, Matthew Olugbenga. (2007) investigated a study on Relationships between ICT competence and attitude among some Nigerian tertiary institution lecturers. The study investigates the relationship between ICT competence and attitude as well as attitudinal constructs of teachers. Four hundred and sixty seven teachers randomly selected from 10 institutions (5 universities and 5 colleges of education) participated in the study. Information bordering on ICT competence and attitude of the teachers were collected employing two research instruments. These include Computer Competence Scale (CCOS) and Computer Attitude Scale (CAS) is a 21-item five-point Likert scale. The resulting data were analyzed using multiple regressions. Findings revealed that attitude bears significant relationship with and also predicts competence. It was further obtained that two of the five attitude constructs predict competence. It was observed that as teachers perceived computers to be useful in their pedagogical enterprise, the interests become aroused which in turn help their computer skills.

Teo and Timothy (2008) examined the attitudes towards use of computers among pre-service teachers. 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 behavioural intention to use
the computer. The results of this study showed 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.

**Deniz (2008)** investigated the computer experiences and computer attitudes of prospective class teachers. The research also investigated the differences between computer attitudes and computer experiences, computer competencies and the influence of gender. Ninety prospective class teachers participated in the research. Computer Attitude Scale- Marmara (CAS-M), and a questionnaire, about their computer experiences, and opinions toward the use of computers in the classroom setting, were administrated. No significant differences were found between computer attitudes of male and female. Differences were found between general computer attitudes and computer liking attitudes of prospective class teachers based on their computer competencies in favour of more competent ones.

**Narayan Prasad Uniyal and Pandey (2008)** made a study on Teachers’ Attitude towards Computer in relation to Sex, Age, Locality and Experience. The objective of the study was to know the level of teacher’s attitude towards the use of computers in secondary schools of Uttarakhand state. To find out the difference, if any between all subject teachers in respect of their acceptability of computers vis-à-vis their sex, locality, age and teaching experience. The survey method was employed. A questionnaire consisting of 5 statement answered ‘yes’ or ‘no’ form
was used. The tool was administered on a sample of 70. Percentage analysis was used to find out the results of the study. The findings of the study stated that Teacher’s attitude about availability of computers in their schools is that they are fully equipped, but in case of acceptability and utility of computers they are sluggish. There is no major difference between male and female teachers of computer education. There is a major difference between the rural and urban teachers attitude in relation to the utility of computers in their classroom teaching. Teachers who are above 40 years and having length of service more than 20 years have more favourable opinions about computer knowledge but they use less computers in classroom teaching their counterparts.

Alrasheedi and Hamed (2009) examined the Information and Communication Technology (ICT): Effects of Gender and Training among Kuwait Teachers. ICT integration into classroom teaching and learning practices depends on teachers' attitude toward ICT and the extent of their training in the technology. Early research suggests that males have more positive attitudes toward ICT and have more knowledge and skills about technology than females. Contemporary research, however, suggests that females have more or less equivalent positive attitudes as they receive more and more knowledge and training about the ICT. The present study used a two way-factorial MANOVA design to examine effect of gender and ICT training on Kuwait public high school teachers' attitudes toward ICT and their use of ICT in their classroom practices. The instrument used to collect the data was a questionnaire prepared by the researcher. In addition to the descriptive and the inferential analyses, the study applied a qualitative analysis to
analyze teachers' responses to the open-ended questions. Results indicated that teachers' attitude toward ICT was slightly positive with male teachers' mean attitude was slightly higher than female teachers' and teachers' mean attitude with ICT training was higher than those without training. Teachers were found to use ICT for educational purposes moderately with female teachers used slightly less ICT. In analyzing the interaction between independent variables (gender and ICT training) on dependent variables (teachers' attitudes and ICT use), the findings suggested that training played an important role in affecting the male teachers' attitudes toward ICT, but had even a greater effect on female teachers' ICT use.

Orlando and Joanne (2009) made a study on Understanding Changes in Teachers' ICT Practices: A Longitudinal Perspective. With the introduction of Information and Communication Technologies (ICT) into schools came the expectation that teachers would adopt ICT and change their practices in particular ways. Research indicates that teachers have not changed in the ways expected. It is suggested in this paper is that limitations in current research methodologies documenting change in teachers' practices are restricting thorough examination of change in teachers' practices mediated by ICT. This paper reports on the design of a study aimed at investigating teachers' practices from an alternative position from the current research. The research design is a grounded, longitudinal, qualitative study using assorted analysis for the collection and interpretation of the data. This involves a combination of secondary analysis of archive data and collection and analysis of primary data. Participants were able to retrospectively describe and understand their own archive and new data, in interviews and observations. This
paper focuses on ways this research design supported examining teachers' practices as including a number of dimensions and the way these dimensions were influenced by the context in which they are situated. Also, the ways this research design provided a means for examining the changes that developed from the teachers' own narratives. This gave some insight into the ways the teachers' understood the changes in their own practices. Examining change from this perspective supports understanding of how and why changes in teaching practices mediated by ICT occur or don't occur. It also contributes to examining the bigger phenomenon of ICT and the long-term impact it is having on teaching practices.

**Cavas Bulent, Cavas Pinar, Karaoglan Bahar, Kisla and Tarik. (2009)** examined A Study on Science Teachers' Attitudes Toward Information and Communications Technologies in Education, integration of Information and Communication Technologies (ICT) into education has been an important concern in many countries. Recently, Turkish Ministry of Education has also done great efforts and major financial investments to implement ICT into teaching and learning environments. However, as in many developing countries, ICT tools are provided to teachers without considering their attitudes toward ICT. The purpose of this study was 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 (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 indicate that Turkish science teachers have positive attitudes toward ICT and although teachers' attitudes toward ICT do not differ regarding gender, it differs regarding age, computer ownership at home and computer experience. It is hoped that the outcomes of this study can be used in shaping innovational practices in the Turkish Educational System.

Dourneen, Jean., and Matthewman, Sasha. (2009) investigated on Seeing through ICT: Re-Viewing Student Teachers' Transformation of Practice from University Session to School Placement. The integration of Information and Communications Technology (ICT) into subject teaching adds an extra layer of complexity for teacher educators. There are technical ICT skills to be taught and there are also many questions about how these skills relate to the development of subject knowledge and pedagogy. We show how tracing the transformation of an ICT activity from a university session to school lessons can make the dilemmas associated with subject knowledge, learning, and pedagogy more visible for teacher educators, with implications for their professional growth. Our self-study reveals the value of being explicit about the intentions behind selection and framing of an activity. We show that identifying a learning problem can offer potential for focused critical framing by teacher educators with student teachers. Finally, we explore the potential of a meta-language of teacher education for promoting a culture of shared practice and professional development for teacher educators and student teachers.
Conducted a survey research study on Science Teachers' Attitudes towards Information and Communication Technologies in Education. The main aim of this study was to find out Turkish primary science teachers' attitudes toward ICT in education and then explore the relationship between teachers’ attitudes and other variables which are related to teachers’ personal characteristics: gender, age, computer ownership at home and computer experience. Stratified sampling was used to obtain data from 1071 science teachers of primary. In order to collect data, an instrument Science Teachers’ Attitudes toward ICT in Education (STATICTE) scale with 31 Likert-type items was developed by researchers. Parametric statistics like ANOVA and t-test pair-wise comparison were conducted to analyze any differences between teachers’ attitudes and other dependent variables. The results indicate that Turkish science teachers have positive attitudes toward ICT and although teachers’ attitudes toward ICT do not differ regarding gender, it differs regarding age, computer ownership at home and computer experience.

Al-Zaidiyeen, Naser Jamil., Mei, Leong Lai., Fook and Fong Soon. (2010) investigated a study on Teachers’ Attitudes and Levels of Technology Use in Classrooms: The Case of Jordan Schools. It investigates the level of ICT use for educational purposes by teachers in Jordanian rural secondary schools. In this study, a survey was employed to collect data. Two separate questionnaires were used in this study, namely Technology Level of Use developed by Isleem (2003) and Teacher Attitudes towards ICT Scale developed by Albirini (2006) Questionnaire was distributed to 650 teachers in Jordan, randomly selected. Four
hundred sixty teachers responded to the questionnaire. The statistical techniques employed in this study were Mean, S.D. and Pearson's correlation coefficients. The survey included questions concerning the level of ICT use as well as questions related to the attitudes of teachers towards the use of ICT. The findings of the study, which were obtained by analyzing the data collected from the teachers revealed that, teachers had a low level of ICT use for educational purpose, teachers hold positive attitudes towards the use of ICT and a significant positive correlation between teachers’ level of ICT use and their attitudes towards ICT was found.

Ertmer, Peggy A., Ottenbreit-Leftwich and Anne T. (2010) discussed important issues in Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect. Despite increases in computer access and technology training, technology is not being used to support the kinds of instruction believed to be most powerful. In this paper, we examine technology integration through the lens of the teacher as an agent of change: What are the necessary characteristics, or qualities, that enable teachers to leverage technology resources as meaningful pedagogical tools? To answer this question, we discuss the literature related to four variables of teacher change: knowledge, self-efficacy, pedagogical beliefs, and subject and school culture. Specifically, we propose that teachers' mindsets must change to include the idea that "teaching is not effective without the appropriate use of information and communication technologies (ICT) resources to facilitate student learning." Implications are discussed in terms of both teacher education and professional development programs.
Sipila and Keijo (2010) discussed importance of ICT in their Impact of Laptop Provision on Teacher Attitudes towards ICT. The use of information and communication technologies (ICTs) in Finnish primary and secondary schools has been increasing for the last decade, but the full potential of the new technology has not been achieved; pedagogical thinking in educational institutes has not advanced in parallel with technological advances. Teachers' attitudes towards the use of ICTs in schools are significant factors in determining how technology is used in schools. The aim of this study is to investigate if there is a difference in attitudes towards ICTs by teachers who have a personal laptop computer (provided by the employer) compared to teachers who have not. The data were collected by means of an online questionnaire, to which 69 teachers out of 196 (31%) from four schools replied. Analysis of the data reveals that teachers who used personal laptops in their work accepted the use of ICTs.

Rahman and Mohammad Ataur (2011), examined the attitude of educators towards computer in the Teacher Educators' Attitude towards Computer: Perspective Bangladesh. This study examined how teacher educators perceive the attitude towards use of computer technology in Teachers' Training Colleges in Bangladesh. They used the valid and reliable instruments of Loyd and Gressard's (1984) Computer Attitude Scale (CAS). The data was collected through questionnaires from 75 teacher educators of teachers' training college in the Rajshahi division in Bangladesh and eventually received 46 responses. The results revealed that the teacher educators possessed their high attitude towards computer.
It also determined that there is no significant difference between male and female in terms of their attitudes toward computer technology.

**Tholappan and Krishnakumar (2011)** attempted a Study on Attitude of Higher Secondary Students towards Computer Assisted Instruction. The objectives of the study were to study the level of attitude of higher secondary students towards Computer Assisted Instruction and to study the factors influencing the attitudes of higher secondary students towards Computer Assisted Instruction. The methodology of the study adopted in this study was Survey Method and the sample was collected from the 300 higher secondary students at +1 level using stratified random sampling technique. The tool employed was Attitude Scale developed by the investigators and the statistical techniques used for the study were Mean, Standard Deviation and ‘t’ test values. The major findings of the study were nearly 16% of students are having high level attitudes towards CAI. Both male and female students are having equal attitude towards CAI. The attitude of students towards CAI who belong to urban residential background was found to be higher than the students with rural background. The attitude of students towards CAI government schools was found to be higher than the students form Aided Schools.

**Larbi-Apau and Josephine A. (2011)** made a study on Computer Attitude, and the Impact of Personal Characteristics and Information and Communication Technology Adoption Patterns on Performance of Teaching Faculty in Higher Education in Ghana, West Africa. This study examined computer attitude, and the impact of personal characteristics and ICT adoption patterns on performance of multidisciplinary teaching faculty in three public universities in Ghana. A cross-
sectional research of mixed methods was applied in collecting data and information. Quantitative data from 164 respondents were analyzed using descriptive, multivariate analysis of MANOVA and simultaneous multiple linear regression statistics. Findings show high and positive computer attitude with affective dominating usefulness, behavior and control factors. Evidence of differential ICT adoption thresholds represented by computer purchase, general use, teaching, and research is observed. Overall ICT-based performance of the teaching faculty is modest. Significant variability in mean differences is reported across ICT performance factor levels on age and academic discipline, but not on gender and professional status. Independently, laggards predicted overall high statistically significant impact on ICT performance at 52% (p less than 0.01). All other significant predictors fall within regression coefficients of 17 and 38% (p less than 0.01 and 0.05 levels). Reasons, incentives and barriers to ICT integration were examined and reported together with special computer proficiency levels. Inclusive development is a palpable opportunity and the best practices are those supported holistically for their impact. Strategies for practice and further studies into adoption and performance behaviors that could ultimately influence investment, personal, professional, and overall growth of ICT in higher education are recommended.

Kibirige, I (2011) carried out a research In-Service Science Teachers' Attitude towards Information Communication Technology. The study explores the relationship between in-service teachers and four independent variables: their attitudes toward computers; their cultural perception of computers; their perceived
computer competence; and their perceived access to computers. Attributes like gender, age, income, teaching experience and teaching methods are investigated. The results of the study show that 92 per cent of the respondents have a positive attitude towards computers. In-service teachers' attitudes are correlated with computer attributes, cultural perceptions and competence, but not with computer access. These findings suggest that computers in secondary and tertiary education improve the quality of teaching. In addition, infrastructure is identified as a constraining force in the implementation of ICT in the science classroom.

Hammond, M., Reynolds, L., and Ingram, J., (2011) analysed the determinant How and Why Do Student Teachers Use ICT?. This is a mixed methods study involving a survey (N = 340) of the entire cohort and a series of semi-structured interviews with a sample of student teachers within the cohort (N = 21). The study explored several themes, including the nature of student teachers' use of ICT; variation in the use of ICT; support for, and constraints on, using ICT; attitudes to ICT and to teaching and learning more generally. It was found that nearly all teachers were receptive to using ICT--more so than their in-service counterparts--and made frequent use of it during their placement (internship) experience. The Interactive Whiteboard (IWB) was central to nearly all student teachers' use of ICT, in good part, because it was already used by their mentors and was widely accessible. Student teachers' use of ICT was categorized in three levels. Routine users focused mostly on the use of the IWB for whole class teaching; extended users gave greater opportunities for pupils to use ICT for themselves; innovative student teachers used ICT in a greater range of contexts.
and made more effort to overcome barriers such as access. ICT use was seen as emerging from a mix of factors: chiefly student teachers' access to ICT; their feeling of "self-efficacy" when using ICT; and their belief that ICT had a positive impact on learning—in particular, the impact on pupils' behavioural and affective engagement. Factors which influenced ICT use included mentoring, training and support. Limitations on student teachers' use of ICT are explored and it is suggested that new teachers need to be supported in developing a more discerning use as they begin their teaching careers.

Hammond and Michael (2011) examined the Beliefs and ICT: What Can We Learn from Experienced Educators? This article contributes to this special edition of "Technology, Pedagogy and Education" by looking at beliefs about knowing and learning held by 15 teacher educators with longstanding involvement in the Association for Information Technology in Teacher Education. Beliefs were challenging to identify but were ascribed to participants through examining accounts of practice on the basis of "what they held true" about teaching and learning. The study uncovered a widely held core belief in knowing as constructivist and a more peripheral belief in learner-centred or social constructivist, pedagogy. Identifying participants' beliefs helped to understand the frameworks in which judgements about teaching and learning with ICT were made even if the impact of beliefs on every day practice could not be taken for granted. The study discusses the importance of beliefs as a stable point of reference in teaching and learning; tensions in categorising beliefs; and the particular role of beliefs in relation to engagement with ICT.
Rengarajan and Senthilnathan (2012) conducted a study on Teacher educators Attitude towards e-learning. The major objective of the study is to assess teacher-educators attitude towards e-learning. The normative study technique has been adopted and 160 teacher-educators from 20 colleges have been chosen as sample through random sampling technique. A standardized questionnaire in five-point scale aimed at the assessment of e-learning attitude was administered. The collected data was analyzed through chi-square analysis. The major findings of the study were nearly 55 per cent of the sample felt that e-learning does not make teaching more difficult. More than 23.13% of the teacher educators have 2 to 4 years experience in computer and only a very few of them 13.13% have less than one year experience in computer. When it comes to the length of experience with the Internet, 25.62% of the teacher-educators who formed the sample had no experience with the Internet. More than 60 percent of the sample held a negative view about e-learning possibility of interaction with students.

Uslu, Oner., Bumen and Nilay T. (2012) analysed the Effects of the Professional Development Program on Turkish Teachers: Technology Integration along with Attitude towards ICT in Education, The purpose of this study is to analyze the impact of the professional development (PD) program on technology integration (TI) besides attitudes towards ICT in education of Turkish teachers. This study demonstrates the outcomes of one group pre-test and post-test design based on data, collected before, just after and six weeks after the PD program. The results of the study revealed that, the PD program had a positive effect on TI
continuing still at the sixth week while little or no change was detected on the teachers' attitudes towards ICT in education.

Behera and Santosh Kumar (2012) conducted a study on An Investigation into the Attitude of College Teachers towards E-Learning in Purulia District of West Bengal, India. Today we are living in an Information and Communication Technology (ICT) era. All over the world, there is a trend to use ICT in the teaching-learning process. The teacher and learner must gain access to technology for improving learning outcomes. ICT is a new paradigm of the teaching-learning process widely accepted as a necessary tool for attainment of developmental goals. Particularly higher education plays an important role for achieving MDGs. In the process of education teacher plays vital role for promoting quality education. In order to development of teacher's professional efficiency, gaining update knowledge and promoting quality education Electronic Learning is very much necessary in the present knowledge and information explosion age. E-Learning is widely accepted and it can be rich and as valuable as the classroom teaching. E-Learning is more useful in educational research. In the circumstance, E-Learning (EL) plays an important role for creating awareness among the teachers. In the present study the investigator made an attempt to study the attitude of college teachers towards E-learning in Purulia district of West Bengal. One hundred teachers (both male and female) teaching in Arts and Science streams were taken as representative sample of the whole population. An attitude scale was used for collecting the data. The means of both groups were tested for significance of difference by using "t" test. The differences in the groups were statistically
significant and the attitude of College teachers was more favourable towards E-Learning.

Goktas and Zekeriya (2012) conducted a study on, the Attitudes of Physical Education and Sport Students towards Information and Communication Technologies. Studies that examine the attitudes toward information and communication technologies (ICT) among physical education and sport students, pre-service teachers and teachers are fairly limited, even though the investments in information and communication technologies at schools and universities have reached an efficient level. This study investigates the attitudes of physical education and sport students and pre-service teachers towards ICT, and the relationship between their attitudes and certain variables such as age, gender, departments, computer familiarity, frequency of computer use and computer ownership. Computer attitude scales were administered to 337 students and pre-service teachers of physical education and sports, and the data collected were analyzed statistically. It was found that the students and pre-service teachers of physical education and sports have positive attitudes toward information and communication technologies, and there are significant correlations between their attitudes and certain variables such as gender, grade, computer ownership, and computer instruction. Recommendations are provided.

Prestridge and Sarah (2012) reported the Beliefs behind the Teacher that Influences Their ICT Practices. Much has been written about the impact of teachers' beliefs and attitudes to ICT as "barriers" to ICT integration (Ertmer, Ottenbreit-Leftwich, & York, 2007; Higgins & Moseley, 2001; Loveless, 2003).
This paper takes a closer look at the types of beliefs that influence ICT practices in classrooms and the alignment of these beliefs to current pedagogical reform in Australia. The paper draws on data collected through the initial phase of a research project that involved an Industry Collaborative of four Catholic primary schools (prep-grade 7). Data are drawn from teacher surveys, interviews and document analysis. The results present specific links between ICT beliefs that are informing teachers' practices. ICT beliefs and practices are aligned to reform agenda for digital pedagogies. The findings of this research inform teacher ICT practice and requirements for ICT professional development.

Topu, Fatma Burcu., Goktas and Yuksel. (2012) examined the ICT Teachers' Assigned Roles and Expectations from Them. To provide a better understanding of ICT teachers' assigned position and to determine school administrators' and other teachers' perceptions towards ICT teachers and these teachers' positions, and to reveal the similar and discrepant aspects of their tertiary education and the roles (work and responsibilities) assigned to them in schools. For this purpose, a qualitative case study research design was used. The study was conducted within three phases. In the first phase, focus group interview with 2 faculty members in Department of Computer Education and Instructional Technologies and 6 ICT teachers, in the second phase, a pilot study encompassing an interview with 2 teachers from other branches and 1 school administrators, and finally face-to-face interviews with 33 participants, 10 of whom were school administrators, 11 of whom were ICT teachers, 12 of whom were teachers from other branches. The data obtained were analyzed using content analysis, and the
findings showed that ICT teachers undertook many roles in their schools apart from the assigned positions determined by MoNE. The fundamental reason for this appeared that ICT teachers were perceived as an expert, a technical staff or a personnel who knows everything about ICT. Further, there occurred some differences and ambiguities between the education they took and the assigned roles and due to these ambiguities that even the ICT teachers could hardly define their assigned roles in schools was observed.

Nagamani., Deepa., Muthuswamy and Prema (2013) reported Teacher's Professional Use of Information and Communication Technology in Secondary Schools in Tamil Nadu. The purpose of the study is to evaluate secondary school teachers' abilities to use Information and Communication Technology (ICT) in schools in Tamil Nadu. Questionnaires method was used for data collection. Around 200 questionnaires were distributed to secondary school teachers and headmasters, in which 157 were completed and returned. Descriptive statistical principles with SPSS software were used for the analysis of the data. The study reports that use of computer and internet exist between the teachers of different age groups and various backgrounds. There was evidence of significant difference in the use of information and communication technology between teachers in different age group and location. The analysis also reports that there was no significant difference in the use of ICT by the gender. Thus, the overall finding of the study reports that teachers are moderately using ICT for professional purposes.
Hue, Ly Thanh., & Ab Jalil, Habibah (2013) conducted study on Attitudes towards ICT Integration into Curriculum and Usage among University Lecturers in Vietnam. Although the integration of information and communication technologies (ICT) into the curriculum is a crucial in ensuring the quality of education, it is still not given greater concern by the administrators and lecturers in some universities in Vietnam. The purpose of this descriptive-survey research is to determine lecturers' attitudes towards ICT integration into the curriculum and its use in the classroom. The research questions sought to measure the frequency of ICT use in teaching and learning among lecturers and their attitudes towards ICT integration into the curriculum to improve teaching; and to determine if a correlation existed between lecturers' attitudes towards ICT integration into the curriculum and their ICT use in the classroom. A population of 109 lecturers at a public university in Vietnam participated in this survey. The results of the correlation analysis identified a slightly moderate positive relationship between lecturers' attitudes towards ICT integration into the curriculum and their ICT use in the classroom. Although ICT was not highly used, lecturers recognized the benefits of ICT that they had chosen to incorporate into their teaching. These findings could be used for future research to promote positive educational changes through the integration of ICT into the curriculum in universities.

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

**Elsaadani and Mohamed Abdelaziz (2013)** analysed in their study Exploring the Relationship between Teaching Staff Age and Their Attitude towards Information and Communications Technologies (ICT). Studied the relationship between attitude and technology. Current research seeks to understand the relationship between teaching staff’s age and their attitude toward ICT. Survey methodology is facilitated through the use of the questionnaires. The survey domain is a random sampling of teaching staff in Egyptian HEI. The population for this study was 500 full-time Faculty staff, and only 412 returned and completed questionnaires are considered as the study sample. The results showed that there is a moderate and positive relationship between the age of participants and their attitude towards ICT. Thus, when considering attitude towards ICT by teaching staff members in Egyptians HEI, age is a significant factor. The result of this research has significant implications to HEI when they plan, develop, and adopt ICT. HEI has to consider the attitude of that teaching staff towards ICT related to their age.

**Vekiri and Ioanna (2013)** carried out a research Users and Experts: Greek Primary Teachers' Views about Boys, Girls, ICTs and Computing. The purpose of this study was to examine primary teachers' views about the abilities and
personality characteristics of boys and girls relative to information and communication technologies (ICTs) and computing, and to explore the relationship of teachers’ gender-stereotyped views with teachers' gender, age, computer experience and self-efficacy in educational computer use. Participants were 241 Greek primary teachers who responded to a structured questionnaire. All teachers recognised that developing ICT skills was equally important for all students, but nearly half of them thought that boys were more likely to have the aptitude, interest and personality characteristics to pursue studies in information or computer science. Teacher views on gender and technology were not associated with gender, self-efficacy in educational ICT use, computer experience or age. Findings suggest that teacher preparation and professional development programmes should address gender equity issues.

Kreijns, Karel. et al. (2013) focused on Adopting the Integrative Model of Behaviour Prediction to Explain Teachers' Willingness to Use ICT: A Perspective for Research on Teachers' ICT Usage in Pedagogical Practices. Information and communication technology (ICT) can enable, support, and reinforce the introduction of new pedagogical practices that comply with the educational demands of the twenty-first-century knowledge society. However, despite this potential and despite the delivering of skills-based professional development and the increase in the level of ICT infrastructure, teachers are more often reluctant rather than willing to use ICT. This article reviews existing literature to 1) select a theoretical model that is suited to explain this, and 2) uncover important variables at various levels, including the individual and school organisation that should be
included in the model. As a result, it adopts Fishbein's Integrative Model of Behaviour Prediction (IMBP). This model forces the explicit consideration of dispositional variables including attitude, self-efficacy and subjective norm that are the direct and indirect antecedents of intentional ICT usage and real ICT use. Rather than concentrating on general ICT usage, IMBP is concerned with the use of specific ICT tools, such as digital learning materials. The authors believe that IMBP as a diagnostic tool will shed more light upon the issues surrounding teachers' ICT usage.

Lal and Chhavi (2014) conducted a study on Attitudinal Study of User and Non-User Teachers' towards ICT in Relation to Their School Teaching Subjects. The present study aimed to know the attitude towards ICT of user and non-user teachers of ICT. The data were collected from 40 (20 male and 20 Female) user and non-user of ICT secondary school teachers from Agra city. Attitude towards ICT was measured by Computer Attitude Scale (CAS), originally developed by Loyd and Gressard (1984). Data were treated by Mean, SD and t-test. The findings of study reveal that the ICT user teachers' attitude towards ICT is highly positive in comparison to ICT non-user teachers but they have also positive attitude towards ICT in relation to their school teaching subjects. It is clear that vast majority of secondary school teachers have positive attitude towards ICT in relation to their school teaching subjects for many reasons.

Copriady and Jimmi (2014) conducted a study on Self- Motivation as a Mediator for Teachers' Readiness in Applying ICT in Teaching and Learning. The aim of this study is to examine teachers' motivation as a great mediator for
teachers' readiness in applying ICT in their teaching and learning. Apart from that, this study was carried out to differentiate the influence of exogenous variables from the endogenous variables based on the academic fields (pure science and social science). This is a quantitative study using a survey method, involving a total of 874 high school teachers in Indonesia, including 446 science teachers and 428 social science teachers. Data was analyzed using path analysis (path analysis/SEM) with AMOS software version 18. The results show that motivation is a significant variable as a mediator between the variables of readiness with ICT application in teaching and learning science and social science. Analysis of structural equation path model (SEM) shows that the data used in this study has a reasonable suitability for the proposed regression model. Thus, it is proved that the two independent variables are linked directly and indirectly to the dependent variable of the study which is the application of ICT in teaching and learning. The implication of this study is that the governments and Ministry of Education take into account teachers attitudes and motivations in terms of ICT application and address this issue by providing sufficient infrastructure, equipment, facilities, and training for teachers to develop positive attitudes towards ICT use in education.

**Raiha. et al. (2014)** is a study that examined pupils' views on an ICT-based learning environment in health learning. The study was a part of the wider European Network of Health Promoting Schools programme (ENHPS; since 2008, Schools for Health in Europe, SHE) in Finland, and particularly its sub-project, From Puijo to the World with Health Lunch, which sought to renew secondary school health education by developing and utilizing an ICT-based learning
environment. The research data were collected through a structured questionnaire presented to pupils (N = 92) in two secondary schools, one rural and one urban, in Eastern Finland. The results showed that pupils' opinions about the ICT-based learning environment were fairly positive. Pupils felt that the ICT-based learning environment was easy to use and supported cooperative learning. Computing and Internet skills positively supported pupils' favourable attitudes towards the ICT-based learning environment. An interesting result from the point of view of e-learning was that the pupils increased their awareness of how to critically evaluate health information found on the Internet.

Yap, Boon Chien., Chew and Charles. (2014) conducted a study on Effectiveness of Demonstrations Supported by ICT Tools on Upper Secondary School Students' Attitudes towards the Learning of Physics. This quantitative research study reports the effectiveness of demonstrations supported by appropriate information and communication technology (ICT) tools such as data loggers, animations and video clips on upper secondary school students' attitudes towards learning of physics. A sample of 94 secondary four express stream (age 16 years) and secondary five normal stream (age 17 years) physics students from four physics classes of a secondary school in Singapore was selected to participate in the study. A pretest-post test quantitative experimental design was used. The results indicated that, for both the express and normal streams, attitudes towards the learning of physics improved significantly with the use of demonstration supported by the appropriate use of ICT tools.
Overbaugh, Richard C., Lu, Ruiling., and Diacopoulos, Mark. (2015) reported on Changes in Teachers' Attitudes toward Instructional Technology Attributed to Completing the ISTE NETS*T Certificate of Proficiency Capstone Program. An evaluation was conducted of teachers' attitudinal perceptions of their confidence for implementation, stages of innovation adoption, and satisfaction, as a result of participating in the International Society for Technology in Education's National Educational Technology Standards-Teachers (ISTE NETS*T) Certificate of Proficiency Capstone Program. The Self-Efficacy and Stages of Concern instruments provide insight into the attitudinal progression of program participants. Data were collected at pre, mid, post, and follow-up points. Results showed that the capstone program is effective; participants were clearly more confident that they could implement the technology-based/enhanced teaching/learning strategies in their schools; had far fewer concerns about their level of preparedness; were anxious to work with others in their schools; and believed their school/classroom climate was conducive to and supportive of technology integration. Additionally, participants' principals and/or supervisors were asked to provide data on their perception of the influence the capstone courses had on their teachers.

2.3 STUDIES RELATED TO APTITUDE TOWARDS ICT

Lavonen, Jari., Lattu, Matti., Juuti, Kalle., Meisalo & Veijo. (2006) conducted a study on Strategy-Based Development of Teacher Educators’ ICT Competence through a Co-operative Staff Development Project. An ICT strategy and an implementation plan for teacher education were created in a co-operative process. Visions and expectations of staff members and students were registered...
by questionnaires and by making notes during sessions in which the strategy was created. Thereafter, an implementation document, where the staff development programme and plans of how to develop ICT infrastructure and to integrate ICT to teacher education, was created. A large programme for staff ICT skills development was implemented and a new infrastructure (a new domain and websites etc.) was developed over a two-year period. On the basis of staff self-evaluation data, staff ICT skills developed substantially and ICT use as part of teacher education grew more versatile. On the basis of our experiences and the data collected during the project, a list of properties needed for a successful staff development project is given.

Drent, Marjolein, Meelissen and Martina (2008) attempted a study Which Factors Obstruct or Stimulate Teacher Educators to Use ICT Innovatively? This article discusses the factors which stimulate or limit the innovative use of ICT by teacher educators in the Netherlands. Innovative use of ICT is defined as the use of ICT applications that support the educational objectives based on the needs of the current knowledge society. Explorative path analysis and case studies were used to study the potential influencing factors. Results show 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. This indicates a limited involvement of the management of teacher training institutes towards the use of ICT within the curriculum.
Goktas, Yuksel., Yildirim, Soner., Yildirim and Zahide (2009) conducted a study on Main Barriers and Possible Enablers of ICTs Integration into Pre-Service Teacher Education Programs. The purpose of this study is to investigate the main barriers and possible enablers for integrating information and communication technologies (ICTs) in Turkey's pre-service teacher education programs. The data were collected by means of questionnaires from 53 Deans in schools of teacher education (STE), 111 teacher educators, and 1,330 prospective teachers, and additionally from interviews of six teacher educators and six prospective teachers. The findings indicate that the majority of the stakeholders believe that lack of in-service training, lack of appropriate software and materials, and lack of hardware are the main barriers for integrating ICTs in pre-service teacher education programs. There was also agreement on the possible enablers; "having technology plans" was the strategy most strongly agreed upon in that category. Based on these findings, we propose the use of several strategies that should enhance successful ICTs integration.

Alrasheedi and Hamed (2009) focused on Information and Communication Technology (ICT): Effects of Gender and Training among Kuwait Teachers. ICT integration into classroom teaching and learning practices depends on teachers' attitude toward ICT and the extent of their training in the technology. Early research suggests that males have more positive attitudes toward ICT and have more knowledge and skills about technology than females. Contemporary research, however, suggests that females have more or less equivalent positive attitudes as they receive more and more knowledge and training about the ICT.
The present study used a two way-factorial MANOVA design to examine effect of gender and ICT training on Kuwait public high school teachers' attitudes toward ICT and their use of ICT in their classroom practices. The instrument used to collect the data was a questionnaire prepared by the researcher. In addition to the descriptive and the inferential analyses, the study applied a qualitative analysis to analyze teachers' responses to the open-ended questions. Results indicated that teachers' attitude toward ICT was slightly positive with male teachers' mean attitude was slightly higher than female teachers' and teachers' mean attitude with ICT training was higher than those without training. Teachers were found to use ICT for educational purposes moderately with female teachers used slightly less ICT. In analyzing the interaction between independent variables (gender and ICT training) on dependent variables (teachers' attitudes and ICT use), the findings suggested that training played an important role in affecting the male teachers' attitudes toward ICT, but had even a greater effect on female teachers' ICT use.

Hammond and Michael (2011) conducted a study on Beliefs and ICT: What Can We Learn from Experienced Educators? This article contributes to this special edition of "Technology, Pedagogy and Education" by looking at beliefs about knowing and learning held by 15 teacher educators with longstanding involvement in the Association for Information Technology in Teacher Education. Beliefs were challenging to identify but were ascribed to participants through examining accounts of practice on the basis of "what they held true" about teaching and learning. The study uncovered a widely held core belief in knowing as constructivist and a more peripheral belief in learner-centered or social
constructivist, pedagogy. Identifying participants' beliefs helped to understand the frameworks in which judgements about teaching and learning with ICT were made even if the impact of beliefs on every day practice could not be taken for granted. The study discusses the importance of beliefs as a stable point of reference in teaching and learning; tensions in categorising beliefs; and the particular role of beliefs in relation to engagement with ICT.

Peeraer, Jef., Van Petegem and Peter (2011) examined the ICT in Teacher Education in an Emerging Developing Country: Vietnam's Baseline Situation at the Start of "The Year of ICT". This study investigates the current situation of ICT integration in teacher education in Vietnam, an emerging developing country at the beginning of integrating ICT in education. 783 educators of five Vietnamese teacher education institutions completed a questionnaire. This analysis illuminates teacher educators' access to ICT, their intensity of use, their related skills, and their confidence in using ICT, as well as their conceptions of learning. Exploratory multiple regression analysis addresses the importance of these different factors at the level of the educator for use of ICT in teaching practice. Even though teacher educators adhere to a constructivist approach to student learning, the use of ICT applications in teaching practice remains limited, mostly replacing traditional teaching practices. The factors currently determining the use of ICT in teaching practice are ICT skills ([beta] = 0.522) and computer confidence ([beta] = 0.158). Suggestions are provided for the country to move beyond an access and skills based approach of integration of ICT in education and for emerging developing countries to cease the promise of ICT for education.
Abuhmaid and Atef (2011) examined the ICT Training Courses for Teacher Professional Development in Jordan. Information and Communication Technology (ICT) is increasingly having pervasive role and presence in the educational milieu as it continues to shape all aspects of our lives. Numerous reform projects have been in place aiming to infuse ICT across education systems. Teachers are widely believed to be the key agents of any educational change. Accordingly, the Jordanian Ministry of Education adopted several ICT training courses aiming to prepare teachers to integrate ICT effectively across the curriculum. The current study focuses on the conduct and effectiveness of ICT training courses within the Jordanian education system. Interviews, questionnaires, direct classroom observations, and field-notes of classroom practices were used for data collection. The findings suggest that ICT professional development courses for teachers were helping them to improve their ICT skills and knowledge. However, other finding highlighted problems regarding the conduct and the nature of these courses including timing and modes of training, follow-up, teacher's belief, school culture, workload, and motivation, appeared to impact the effectiveness of training courses.

Wikan, Gerd., Molster and Terje (2011) conducted a study on Norwegian Secondary School Teachers and ICT. ICT is meant to be integrated in all subjects in Norwegian schools; nevertheless many teachers are reluctant to use ICT in their own teaching. This paper explores to what extent teachers use ICT in their classroom teaching and what teacher-level factors influence the use of ICT. It draws on an analysis of 10 focus-group interviews with 10 teachers and a
quantitative study of 59 teachers in three lower secondary schools in Hamar, Norway. The teachers showed commitment to ICT; however, may did not see the educational value, except for increased access to learning material and to stimulate learner motivation. Teachers also expressed lack of ICT confidence even though they have been taking part in ICT courses. A main finding is that to integrate ICT in one's own teaching is a difficult and gradual process and teachers must be given time to find their own way to merge ICT with their own teaching style.

Musarurwa and Charles (2011) conducted a study on Teaching with and Learning through ICTs in Zimbabwe's Teacher Education Colleges. The use of ICTs (information and communication technologies) in Zimbabwe's teacher education colleges is of paramount importance. The teacher trainees have a dual role to play: learning through ICTs and also learning how to teach through them. Interestingly, the rate at which schools have embraced the use of ICTs is unprecedented, but this has not been matched with an equal effort by teacher education colleges and hence teacher trainees have been less exposed and trained in using such technologies. Evidently, this has created a mismatch between the need for teachers who are conversant with ICTs and e-learning and their availability.

Zare-ee and Abbas (2011) examined the University Teachers' Views on the Use of Information Communication Technologies in Teaching and Research. Because of the potentialities and influences of information communication technologies (ICTs) in facilitating research and instruction in higher education, students' learning products and processes can no longer be restricted to ink on
paper. The problem, however, is that ICT use for instructional purposes by staff members at institutions of higher education can be affected by socio-cultural perceptions in different contexts. This study used a convergent parallel mixed method design consisting of a survey followed by interviews to describe the views of a group of Iranian university teachers on the application of ICTs in teaching-learning processes as well as their reported uses of ICTs. 115 randomly selected full-time faculty members in social sciences, engineering, science, and the arts in three major universities in central Iran participated in the survey. Their familiarity with ICTs, their views about the instructional benefits of ICTs in higher education, and their reported uses of ICTs were studied using a researcher-made 20-item Likert-scale questionnaire. A purposive subsample of 15 was also interviewed to offer data on obstacles blocking their ICT use. The analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education. In spite of this, they reported infrequent uses of ICTs for research and instruction. Limited resources and facilities, insufficient skills, lack of time for initial preparations, and policy-makers' little support and encouragement were reported as the most serious problems facing university teachers in the use of ICTs. Based on the results and the possible social, cultural, and economic limitations, the article highlights the necessity of promoting staff members' and policymakers' knowledge of the educational potentials of ICTs as a major priority in in-service trainings.
Martinovic, Dragana., Zhang and Zuochen (2012) investigated the Situating ICT in the Teacher Education Program: Overcoming Challenges, Fulfilling Expectations. This exploratory case study examined pre-service teachers' expectations of and attitudes toward the learning and integrating of ICT into their teaching, and their perceptions of the availability and use of ICT in the Teacher Education Program (TEP) and their placement schools. For two years in a row the researchers collected data through online survey and focus group meetings. The findings confirm what has been reported in the literature, but also identify some challenges which may be present internationally in TEPs, such as inadequate access to ICT both in TEPs and in schools, and lack of modeling by tertiary instructors.

Prestridge and Sarah (2012) investigated the Beliefs behind the Teacher that Influences their ICT Practices. This paper explores teacher beliefs that influence the ways Information and Communications Technologies (ICT) are used in learning contexts. Much has been written about the impact of teachers' beliefs and attitudes to ICT as "barriers" to ICT integration (Ertmer, Ottenbreit-Leftwich, & York, 2007; Higgins & Moseley, 2001; Loveless, 2003). This paper takes a closer look at the types of beliefs that influence ICT practices in classrooms and the alignment of these beliefs to current pedagogical reform in Australia. The paper draws on data collected through the initial phase of a research project that involved an Industry Collaborative of four Catholic primary schools (prep-grade 7). Data are drawn from teacher surveys, interviews and document analysis. The results present specific links between ICT beliefs that are informing teachers’
practices. ICT beliefs and practices are aligned to reform agenda for digital pedagogies. The findings of this research inform teacher ICT practice and requirements for ICT professional development.

Reading, Chris., Doyle and Helen (2013) focused on Teacher Educators as Learners: Enabling Learning while Developing Innovative Practice in ICT rich Education. It is time for teachers to consider themselves as learners in ICT-rich learning environment and to become more aware of factors that enable their learning in such environment. The notion of teachers as learners in ICT-rich environments is not new but the focus is usually on school teachers and formal professional development, rather than teachers in universities learning as part of the change-of-practice process. This research investigated the enablers that were identified by teacher educators as most significant in the development of their Technological Pedagogical Content Knowledge (TPACK) while transforming their teaching practice. As part of the evaluation of the effectiveness of strategies implemented to improve graduating pre-service teacher ability to demonstrate innovative use of ICT in education, Most Significant Change Stories were compiled from focus group discussions with teacher educators in four curriculum areas, English, Mathematics, Science and History. The teacher educators were provided with support, an ICT Pedagogy Officer, as they planned, implemented and evaluated innovative ICT-rich learning experiences. The enablers identified by the teacher educators as contributing most significantly to their learning are explained. Findings show that there are common themes across these enablers and that not all enablers are factors over which the teacher educator has control.
Manny-Ikan, Edith., Tikochinski, Tal Berger., Bashan and Zipi (2013) reported their findings through their study, Does Use of ICT-Based Teaching Encourage Innovative Interactions in the Classroom? Presentation of the CLI-O: Class Learning Interactions-Observation Tool. This article presents a new classroom observations analysis tool (CLI-O: Class Learning Interactions--Observation tool). The CLI-O tool enables the collection of various data regarding the use of ICT tools, organization of learning, and teacher-student interactions in the lesson. Several examples demonstrating the use of CLI-O and some preliminary findings derived from this tool are presented. CLI-O was developed in order to answer the question: Is learning in an ICT-based environment characterized by a unique pedagogy expressed, for example, by student-centered pedagogy while the teacher serves as a guide who mediates learning using a variety of technological tools? For example, in lessons observed and analyzed by CLI-O in the present study, a large part of the learning was found to be whole class learning, mainly frontal learning, and the teacher was at the focus of the lesson. CLI-O supplies a systematic description of classroom processes and enables teachers, teacher educators, and researchers to examine the implementation of ICT in teaching and learning and perceive it as a gradual ongoing process of building a new pedagogy tailored to the needs of the 21st century.

Badia, Antoni., Meneses, Julio., Sigales and Carles (2013) made a study on Teachers' Perceptions of Factors Affecting the Educational Use of ICT in Technology-Rich Classrooms. The purpose of this study is to identify the main factors that influence teachers' decision-making regarding the educational use of
ICT (Information and Communication Technologies) in technology-rich classrooms. Method: We collected data from 278 teachers in Catalonia (Spain) working in eight primary and secondary education schools rich in educational technology. The specific questionnaire used to that end includes an extensive range of items to obtain information about the teachers' perceptions of the factors influencing the use of ICT in the classroom. We have identified and characterized five factors that influence the educational use of ICT in the classrooms, which in this study we call: utility and educational setting, teacher support, availability and access in the classroom, technological expertise and access outside the classroom. These results may be useful for fostering improved integration processes for ICT in the classroom, and also for focusing teaching training about this content.

Brun, Mario, Hinostroza and J. Enrique (2014) conducted a study on Learning to Become a Teacher in the 21st Century: ICT Integration in Initial Teacher Education in Chile. This paper presents the most relevant results from a national study about the availability and use of ICT in 46 Initial Teacher Education institutions in Chile, implemented during 2009 as part of the OECD (Organization for Economic Cooperation and Development) international project "ICT in Initial Teacher Training." Main findings show an overall favorable context for the pedagogical use of ICT in such institutions, in terms of ICT infrastructure, support, policies and teachers' self-reported ICT related skills. In addition, teachers report a quite frequent use of some ICT resources, giving a high importance to students' learning of ICT. However, ICT integration is limited to a few specific resources (mainly computers and projectors), mostly applied to perform "traditional"
pedagogical activities. Therefore, the expectations about the improvement of teaching and learning in Teacher Education in Chile through the integration of ICT, are not been fulfilled yet. This paper can constitute a significant contribution for developing more innovative and better quality pedagogical practices in this education level.

Nayark, Ajitha K., Barker and Miles (2014) reported the Computer Labs as Techno-Pedagogical Tools for Learning Biology-Exploring ICT Practices in India. In Indian secondary schools, as in many countries, Information and Communication Technologies, ICT, are changing the image of learning places, the roles of teachers and students, and often the entire classroom learning ambience. This study investigates current practices for learning biology in school computer labs in India in the light of the existing Indian pedagogical practices. The increasing availability of technology-based learning resources has increased the techno-pedagogical possibilities (i.e. the possibilities for pedagogical use of technology) in biology learning, and many schools are augmenting their ICT infrastructure by setting up fully-equipped computer labs. Nevertheless, the teaching of biology currently continues to be partly in the traditional classroom and partly in the computer labs. In fact, most schools are not yet willing to invest large amounts in computer infrastructure, despite school policies that encourage teachers to make use of ICT learning resources made available out of state-provided funding. In this study, biology teachers' techno-pedagogical perspectives and the nature of secondary school students' ICT skills deployed in computer labs are explored. In terms of results, we report that teacher ratings on the techno-
pedagogical skills they require while teaching biology in computer labs revealed that they were, in fact, well aware of the wide ranging technological possibilities: text processing, website development, spreadsheets, layouts and multimedia. Again, observations of the lab sessions themselves revealed that students were deploying significant ICT skills: text processing, information retrieval, information processing and information gathering. Also, it turned out that the teachers were actually employing the imaginative range of the skills that they had espoused in their chosen ratings. In summary, when computer labs became the sites for learning biology, the combination of the ICT provided, together with the teachers' emerging techno-pedagogical practices, presents heartening possibilities for promoting student learning in India in future.

**Avidov-Ungar, Orit Iluz and Irit Emma (2014)** conducted a study on Levels of ICT Integration among Teacher Educators in a Teacher Education Academic College. This article examines the perspective of teacher educators and academic officials in an academic teacher education program regarding the integration of ICT in the teacher education program. The study portrays the current state of the ICT integration process and the implementation of the program for "Adapting Teacher Training Colleges to 21st Century Education" in a specific academic college in one of Israel's outlying areas. This mixed methods study combined quantitative and qualitative methods. Data were collected by means of a closed questionnaire, an open-ended questionnaire for the teacher educators (N = 68), and semi-structured interviews conducted with the academic officials (N = 12). Findings revealed a hierarchical range of ICT integration in teaching, which
reflects different profiles of teacher educators who integrate innovative pedagogies. The three integration levels (the basic level, the focused level, and the creative level) reflect the scope of ICT integration in the context of teacher training, creating a continuum of integration and implementation, which can serve as an infrastructure for the effective adoption and integration of this innovative pedagogy by teacher educators and academic officials in academic teacher training colleges.

**Gill, Lincoln., Dalgarno, Barney., Carlson and Lauren (2015)** made a study on How Does Pre-Service Teacher Preparedness to Use ICTs for Learning and Teaching Develop through Their Degree Program?. It is now well accepted that graduating teachers need the capacity to integrate Information and Communication Technologies (ICTs) in ways which harness their learning affordances and develop students' digital literacy. However, effective ICT integration in the classroom is challenging because it requires complex application of technological, pedagogical and content knowledge. A key challenge for teacher educators is the provision of learning experiences in university and on professional placement that will allow pre-service teachers to develop these capacities. Understanding the learning process of pre-service teachers in relation to ICT integration is essential if this teacher education challenge is to be addressed. This article reports on a study in which a group of 11 pre-service Primary school teachers were interviewed at stages through their program with a focus on their preparedness to use ICTs in their teaching. The study used a model developed by Taylor (2004), which defines three stages of teacher ICT capacity development
(uncritical and accepting, beginning to problematise, and reflection and theorisation), as an analytic lens. Using this model, preservice teachers were positioned against the stages in the model at six points during their four year program, and factors contributing to their movement through the phases were identified.

Aslan, Aydin., Zhu and Chang (2015) developed Pre-Service Teachers' Perceptions of ICT Integration in Teacher Education in Turkey. Information and Communication Technology (ICT) integration in teacher education and teaching practices of teachers is a complicated and challenging issue. As far as pre-service teachers are concerned, this becomes critical because they need to be equipped with the competencies for their future teaching practices. The objective of this study is to identify pre-service teachers' perceptions of ICT integration in teacher education and its association with their teaching practices. A stratified two-stage probability sampling design was used. Firstly, three Turkish state universities with the highest and lowest number of the pre-service teachers were chosen. Secondly, pre-service teachers from the subject domains of Turkish language, social sciences, elementary education mathematics and science were selected. A qualitative method was used in this study. Data were collected from 782 pre-service teachers from open ended questions in a survey and interviews were conducted with 15 participants. Qualitative data were analyzed with thematic coding. The results identified the specific conditions of ICT integration in teacher education and pre-service teachers' perceptions of ICT integration and the associations with their teaching practices.
Raman, Raghu., Venkatasubramanian, Smriti., Achuthan, Krishnashree., Nedungadi and Prema (2015) developed Computer Science (CS) Education in Indian Schools: Situation Analysis Using Darmstadt Model. Computer science (CS) and its enabling technologies are at the heart of this information age, yet its adoption as a core subject by senior secondary students in Indian schools is low and has not reached critical mass. Though there have been efforts to create core curriculum standards for subjects like Physics, Chemistry, Biology, and Math, CS seems to have been kept outside the purview of such efforts leading to its marginalization. As a first step, using the Darmstadt model from the ITiCSE working group that provides a systematic categorization approach to CS education in schools, we coded and analyzed the CS situation for the Indian schools. Next, we focused on the motivation category of the Darmstadt model and investigated behavioral intentions of secondary school students and teachers from 332 schools in India. Considering the CS subject as an educational innovation, using Rogers' Theory of Diffusion of Innovations, we propose a pedagogical framework for innovation attributes that can significantly predict-adoption of the CS subject among potential-adopter students and teachers. Data was analyzed to answer research questions about student and teacher intentions, influence of gender, school management, and school location in adopting CS. Interestingly, girls, urban students, teachers, and private schools were seen favoring the adoption of CS. An important issue that needed to be addressed, however, was the interchangeable use of terms like CS, Informatics, ICT, and digital literacy.
Alemu and Birhanu Moges (2015) investigated the Integrating ICT into Teaching-Learning Practices: Promise, Challenges and Future Directions of Higher Educational Institutes. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with students and technologies. Information and Communication Technologies (ICTs) have become commonplace entities in all aspects of life. The use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. The use of ICT in education lends itself to more student-centred learning settings and often this creates some tensions for some instructors and students. But with the world moving rapidly into digital media and information, the integration of ICT into teaching-learning practices is becoming more and more important and this importance will continue to grow and develop in the 21st century. This study aimed at exploring the process of integrating ICT into teaching-learning practices and its emerging challenges in Adama Science and Technology University. In this study, a mixed design (quantitative & qualitative) in line of descriptive survey method was used. The sample population consisted of 203 respondents (188 instructors, 10 school deans and their vices and 5 department heads) from five schools. Instruments were observation, individual interviews and questionnaires. The study argues the role of ICT in transforming teaching and learning and seeks to explore how this will impact on the way programs will be offered and delivered in the universities of the future. The analysis of data revealed
that integrating ICT into teaching-learning is yet to be accomplished. The data revealed that the participants, both the instructors and students, have positive attitudes towards ICT and considerable knowledge and positive understanding of ICT and its potential in teaching and learning. However, the university fails to provide appropriate ICT-training courses for instructors to develop their technical ICT skills. Having said this, there are crucial examples of horizontal integration; that is, the instructors provide opportunities for the students to use ICT in meaningful contexts. The finding suggest that there is a relationship between the practitioners' stages of concern and stages of adoption, which can be described as follows: the personal level of concern moves from the "self-concerns" to "ask and impact-concerns", the personal adoption level is also likely to move from entry to invention. Although the finding reveal some crucial factors that has prevented the instructors and students from using ICT in teaching and learning, among these the institutional ones such as lack of proper access to ICT resources, overcrowded-classrooms, lack of technical and pedagogical support are more influential on the integration process. The researcher then recommended that, the Ministry of Education and University should pass a bill in the National Assembly on the use of effective ICT facilities in the educational system by provision of adequate fund, securing of ICT experts in university and ensuring that these facilities are monitored from time to time.

Albugami, Sultan., Ahmed and Vian (2015) conducted a study on Success Factors for ICT Implementation in Saudi Secondary Schools: From the Perspective of ICT Directors, Head Teachers, Teachers and Students. The role of
Information Communication and Technology (ICT) in education is undisputed globally. Therefore, many developed and developing countries have invested heavily in the ICT sector in education. Saudi Arabia is one of these countries. However, although it has invested massively in the ICT sector in education, the progression has often been disappointing--resulting in a number of serious questions being raised for decision-makers and educators alike. One of the most important of these questions is "what factors affect the successful implementation of ICT in schools." Hence, the importance of this paper is to find an answer to this question and related questions from the participants' perspective. Consequently, the study is primarily concerned with qualitative data, collected in semi-structured interviews with two ICT Directors, four Headmasters, four teachers and four students, in Saudi secondary schools. Generally, the results showed that ICT was perceived as an important tool in improving performance, collaboration, learning experience and learning outcomes. However, some challenges that affect the application of ICT in Saudi schools are, for example, the lack of space, resources, maintenance, a lack of ICT skills among school along with a lack in ICT training and a lack of clear ICT policies. However, the overcoming of these obstacles could turn these barriers into positive factors to aid in the success of ICT implementation.
2.4 CONCLUSION

As every piece of ongoing research is connected with the work already done to attain an overall relevance and purpose. The review of literature became a link between the research proposed and the studies already done to add to the knowledge in a meaningful way. The review has given ideas about the different explanations given by the authors conclusions and differences by different authors. The analysis of these factors helped the investigator to understand many facets of the complex issue and has led to a new possibility that can be researched upon. Thus the review of literature played its important role in research for both planning and in showing its relevance and significance.

To get the good source of information, The researcher reviewed the literature in referred journals, and Ph.D. dissertations and abstracts, encyclopedia of educational research and research periodicals in order to see what the researchers have found out so far.

The review of literature provided clue to the investigator to formulate the relevant objectives and hypotheses clearly and precisely for a worthy study and helped the investigator from the victims of duplication of what had already been done by other researchers. The research methodology adopted by different researchers helped the investigator to focus on how the study is to be conducted further. The statistical techniques used in various studies helped the investigator to select and apply appropriate statistical procedures according to the design of the study. The findings, recommendations and educational implications given by various authors had given the idea to the investigator to understand complicated
and complex issues and to carry on further research on student teachers in colleges of education.

The survey of the related literature prompted the investigator to finalize the title of the research and to choose attitude, aptitude and familiarity as variables for the current study, as these are very important factors for complete professional development of the teacher educators. Further no research studies have been undertaken including these variables earlier. Hence, studies on these components have been taken by the investigator to throw light on the significance of attitude, aptitude and familiarity and find out the co-relation among these variables.