CHAPTER-II

REVIEW OF RELATED LITERATURE

“Twice and thrice over, as they say, good is it to repeat and

review what is good.” — Plato

2.0 INTRODUCTION

A study of related literature is a very important step not only in finding solution to a
problem but also in the formation of hypotheses and in the selection of method and tools
to be employed in the interpretation of results.

Survey of related literature avoids risk of duplications, provides theories ideas
explanations or hypotheses valuable in formulating the problem and contributes to the
general scholarship of the investigator.

2.1 SIGNIFICANCE OF THE REVIEW

Researcher to his/her field of current investigation is essential. Such a review serves the
following purpose. The importance of reviewing studies already made in one’s field of
investigation has beautifully been stated by John W. Best (1977) in the following words:

“Practically all human knowledge can be found in books and libraries. Unlike other
animals that must start a new with each generation, man builds upon the accumulated and
recorded knowledge of the past. His constant adding to the vast store of knowledge
makes possible progress in all areas of human Endeavour. A familiarity with literature in
any problem area helps the student to discover what is already known, what others have been promising or disappointing and what problems remain to be solved”.

Thus for any investigator, the study of literature related to his/her field of current investigation is essential. Such a review serves the following purposes (Good et al., 1941)

Thus for any researcher the study of literature related

- To show whether the evidence already available solves the problem adequately without further investigation and thus avoids the risk of duplication.
- To provide ideas, theories, explanation of hypotheses valuable in formulation of the problem.
- To suggest methods of research appropriate to the problem.
- To locate comparative data useful in the interpretation of result.
- Therefore, the researcher studied the surveys of research in education and educational journals available and prepared an abstract of review that is being presented in the succeeding paragraphs.

After having referred several journals, periodicals, books, abstracts, web-sources and so on, the investigator has obtained only a very few studies on environmental degradation awareness and attitude towards environmental education. Hence, the present investigation may be considered as a pioneering work in this area. The investigator, based on the review of related studies collected, prepared an abstract of the review that is being presented in the succeeding paragraphs.
2.2 DIAGRAMMATIC REPRESENTATION OF REVIEWS

Fig 2.0 shows the diagrammatic representation on the Review of Literatures

2.3 STUDIES ON SMART CLASS ROOM

2.3.1 INDIAN STUDIES

Aryan 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
85 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 favorable opinions about computer knowledge but they use less computers in classroom teaching their counterparts.

**Ananda Kumar (2009)** conducted a study on Utilization of Information and Communication Technologies in Training the B.Ed. Student-teachers in Tamilnadu. The major objective of the study was to find out the level of Awareness and Utilization of Information and Communication Technology among the B.Ed. student-teachers. The study belongs to Normative Survey method and the tools used in the study were Questionnaire to measure Awareness and Utilization (AUQ) of ICT devices and Availability of ICT schedule. The 880 samples of student-teachers from 10 different colleges of education were selected though stratified random sampling technique. The statistical techniques used in the study were average, standard deviation, ‘t’ test and Correlation Co-efficient ‘r’ value. The major findings of the study revealed that level of Awareness and Utilization of ICT devices among the colleges with high availability of ICT devices was found to be high among the student teachers of age group above 30 years whereas their utilization was less. The awareness and utilization of ICT devices among the female student-teachers were significantly more than male student-teachers. The utilization of ICT devices among the Science major student teachers were more than the Arts and Mathematics major student-teachers.
Ajatha Swamy (2010) investigated a study on Internet Awareness and Competence among High School Students and Teachers. The present study examined the effect of ‘Mahiti Sindhu’ project which aimed to train high school students in the basics of computer operation and create general awareness including Internet. The sample comprised 100 high school students and 40 teachers taken from 5 taluks of Bijapur district were selected through Stratified Random Sampling technique. The tools used were Test of Internet Awareness and Test of Competence to use Internet. The researcher used Mean, SD and t-test for analysis of scores obtained. The findings of the study stated that the Mahiti Sindhu project has significantly enhanced the awareness and competence to use Internet among high school students. There is no significant difference between high school Boys and Girls and also rural and urban students in terms of awareness and competence to use Internet. Mahiti Sindhu project has significantly enhanced the awareness of Internet and competence to use Internet among the teachers who were involved with the project.

Anandakumar and Anandan (2010) conducted a study on Awareness and Utilization of Information and Communication Technologies (ICTs) in Smart class room among the Self-financing B.Ed. College Student-teachers in Krishnagiri District. The study belongs to Normative Survey Research. The objectives of the study were to find out the level of Awareness and Utilization of ICTs in smart class room among the Self-financing College B.Ed. student-teachers. To find out the level of Awareness on ICT devices among the Self-financing College B.Ed student-teachers with regard to demographic variables and
to find out the level of Utilization of ICTs with regard to demographic variables. The tool used in the study was Awareness and Utilization Questionnaire developed by the Investigators. The Stratified Random sampling technique was followed and 171 samples were selected for the study. Different Statistical measures such as Mean, Standard Deviation and ‘t’ test to analyze the data. The findings of the study noted that mean Awareness scores of Female and Student-teachers of age above 25 years are significantly more aware than their counterparts. There is no significant difference between student-teachers with regard to Martial Status and Basic Qualifications. On observing mean Utilization scores, it was noted that among Male-Female and UG-PG qualified student-teachers the Utilization of ICTs were similar whereas student-teachers of age up to 25 years and unmarried are significantly more aware than their counterparts.

Noushad Husain (2010) investigated a study on Teacher Competencies for the Use of Information Communication Technology in smart classroom. This study aimed to identify the competencies needed by teachers for development and implementation of Information Communication Technology (ICT) based education in Smart Class room. Survey method of research was employed for the study. A rating scale was used to know the ICT related competencies that teachers need for instructional purpose. The rating scale consisted of 47 items based on four types of teacher competencies namely Technological ICT competencies, Pedagogical ICT Competencies, Didactical ICT Competencies and Social ICT Competencies. The sample consisted of 73 teacher educators among which 44 were males and 29 females. Data was collected through the use of e-mail and by personally contacted the respondents and analyzed using frequencies.
Findings of the study reveal that all the Teacher Educators were agree that the following ICT competencies that teachers need to develop are: (i) Use 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 in the class well as implement co-operative learning strategies using ICT. Using ICT as 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 humor and good manners during the teaching and learning process.

Rajalakshmi and Anandan (2010) study conducted on Opinion of the Teacher Trainees towards ICT is to measure the level of opinion towards ICT among the Teacher Trainees in Smart Classroom and also to find out the significant difference between the Mean values of level of opinion towards ICT among 58 selected variables. The tool on the Opinion towards ICT among Teacher Trainees consisting of 30 items was constructed by the Investigators. The nature of the study was Survey method and sample size was 120 Teacher Trainees from 3 private Teacher Training Institutes. The statistical techniques such as Mean, Standard Deviation and ‘t’ test were used to analyze the data. The salient findings of the study are Significant positive opinion was observed among the Teacher Trainees towards ICT with various dimensions such as Computer, PowerPoint Presentation and Internet. Women Teacher Trainees show high positive significant difference in the PowerPoint presentation of opinion towards ICT than their counterparts.
Rural and Urban Teacher Trainees have similar level of opinion towards various dimensions of ICT. Arts group Teacher Trainees shows positive opinion towards PowerPoint presentation of ICT than the Science group Teacher Trainees. Similarly Science group Teacher Trainees shows positive opinion towards Internet of ICT than Arts group Teacher Trainees. In PowerPoint presentation Women Teacher Trainees opinions was significantly higher than the Male.

Gopal (2010) investigated a study on Attitude on e-learning in Classroom Instruction among the B.Ed. Students at Colleges of Education. The Major objective of the study is to find out the Attitude on e-Learning in Classroom Instruction among the B.Ed. Students at Colleges of Education. The Study belongs to a Survey Research Method. The size of the sample is 360 B.Ed. Students selected through Random Sampling Technique. Investigators developed the tool, ‘Attitude on e-Learning in Classroom Instruction (AECI)’ based on the four components such as Multimedia, Web, Video-Conferencing and Closed Circuit Television (CCTV). The Tool consists of fifty items in Four-point Rating Scale. Mean, Standard deviation, Percentage and ‘t’ test were used for analyzing the data. The findings revealed that there was no significant difference between the Mean scores of the attitude of B.Ed. students towards e-learning in classroom instruction with respect to Gender and Parental occupation. There is a significant difference between the Mean scores of the attitude of B.Ed. students towards learning for classroom instruction with respect to their discipline of the Subject. Further, the Attitude score on e-Learning for Classroom Instruction among the B.Ed. Students was 53.03% which is found to be
average. In the case of 82 component-wise percentage scores, the Web component is higher than the other components.

**Anandan and Venkateswaran (2011)** conducted a study on Awareness towards Computer Education among Elementary Teacher Trainees. The objectives of the study are to find out the level of awareness towards Computer Education among Elementary Teacher Trainees, to find out the significant difference between Government Institute Teacher Trainees and Self-finance Institute Teacher Trainees towards Computer Education. There is no significant difference between the Government Teacher Training Institutes and self-finance teacher training Institutes towards awareness towards computer education. The descriptive survey method was adopted for the study and the sizes of the sample were 300 Elementary Teacher Trainees in both Government and Self-finance Institutes at Namakkal district. Awareness towards Computer Education questionnaire developed by the Investigators was used as tool for the study and statistical techniques like Mean, Standard Deviation and ‘t’ test for analyzing the data. The major findings of the study were found out that the Teacher Trainees have more awareness towards computer education. The Teacher Trainees of Government institutions have more awareness than the Self-finance Institute Teacher Trainees based on the gender and locality. The study clearly shows no significant difference within variables of government and self-financing teacher trainees.

**Verma (2011)** attempted a Survey study on Use of Communication Technologies in Smart Class room by Male and Female Teachers of Professional Courses. The objective of the study was to examine the communication technologies being used by teachers of
professional courses in classroom on the basis of gender. The sample comprises of 102 teachers of degree colleges running professional courses in Rohilkand region of U.P. of which 75 male teachers and 27 female teachers were selected through stratified random sampling. A tool was developed to assess the use of communication technologies depending upon various aspects of computer, internet, O.H.P, L.C.D, ETV facility, Slide projector, Audio and Video conferencing, CD-ROM. The statistical techniques used in the study were percentage and critical ratio. The study revealed that the significant difference exists regarding the use of O.H.P. between male and female teachers of professional courses. It was also found that communication technologies; computer internet; audio, video conferencing facility and CD-ROM were used by more number of male teachers than female teachers but the difference is not significant. It also revealed that the use of educational television and audio-video conferencing were adopted only by a very few percentage of teachers.

2.3.2 STUDIES DONE ABROAD

Bee Theng Lau and Chia Hua Sim (2008) conducted a study on Exploring the Smart class room and Extent of ICT Adoption among Secondary School Teachers in Malaysia. Hence, the aims of the study were to describe the level of ICT use by teachers among schools in Malaysia. To determine teachers’ perceived competency and perception of ICTs. To describe the obstacles faced by teachers in ICT use and to identify teachers’ training and support need. A survey was conducted to collect both quantitative and qualitative data on ICT adoption of teachers’ in schools. The instrument used was a self-administered questionnaire consists of six sections. The questionnaires were randomly
distributed to some 250 secondary schools teachers of Mathematics and Science. A total of 212 completed questionnaires were received and data were analyzed using SPSS version 15. From the study, it appears that most of them are positive towards Smart classroom with the use of ICT use in school, and they appreciate the use of ICT in enhancing teaching and learning. Result also showed that they are positive towards further integration of technology into classroom instruction. Training therefore, should be offered to teachers on a continuous, rather than a one-off, basis so that their IT knowledge is upgraded over time.

Yesenin Gulbahar and Ismail Guven (2008) conducted a Survey research on ICT Usage and the Perceptions of Social Studies Teachers in Smart classroom at Turkey. This research study sheds light on the use of ICT tools in primary schools in the social studies subject area, by considering various variables which affect the success of the implementation of the use of these tools. Convenience sampling was used to reach the participants in this study. The participants for this study were 326 social studies teachers from fourth and fifth grade of various primary schools, who voluntarily participated in the study. The results showed that although teachers are willing to use Smart classroom and ICT resources and are aware of the existing potential, they are facing problems in relation to accessibility to ICT resources and lack of in-service training opportunities.

Bulent Cavas, Pınar Cavas, Bahar Karaoglan and Tarik Kisla (2009) conducted a survey research Study on Science Teachers' Attitudes toward Smart classroom with Information and Communication Technologies in Education. The main aim of this study
was to find out Turkish primary science teachers’ attitudes toward Smart class room with 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 Smart class room and ICT in Education (STATICTE) scale with 31 Liker-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.

**Naser Jamil Al-Zaidiyeen, Leong Lai Mei and Fong Soon Fook (2010)** investigated a study on Teachers’ Attitudes and Levels of Technology Use in Smart 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.

**Abbas Zare-Ee and Abbas Shekarey (2010)** conducted a study on Comparative Study of the Use of ICT in Smart class room for English Teaching-Learning Processes. The present study was conducted to compare the amount and quality of ICT use in English teaching-learning processes among the faculty members of Medical and Non-medical Universities in Kashan, Iran and to explore the dimensions in which the two groups can benefit from one another and from ICT training in this respect. Out of a total of 255 full-time university teachers teaching at medical and nonmedical universities in the region, 193 were chosen to participate in the study using a simple random sampling technique and the Morgan & Kritjki table for sample selection. A researcher-made 5-point Likert scale questionnaire containing 50 items was used to collect the necessary data on the amount of access and use ICT in the two environments. The Cronbach’s Alfa reliability for this instrument was shown to be 0.8. To answer the research questions, t-test and the analysis of variance were used and the differences in ICT use for learning and teaching were analyzed. The results of the analyses showed that there was a significant difference in the amount of ICT use among the faculty members of medical and non-medical universities. For reason considered in length, teachers at medical universities used ICT significantly less than the other group. Results also indicated that there was a significant
difference between the two types of universities with regard to the availability of computers and the amount of ICT training and use. No significant effects on the use of ICT in education were observed for age, teaching experience, and university degree. University teachers with different fields of study showed significant differences only in non-medical universities. Based on the findings of the study suggestions are made for the improvement of teaching and learning activities through the use of ICT.

**Jacobson Barineka bina, Obomanu and Baribor Vikoo (2011)** conducted a study on Utilization of Information and Communication Technology for Quality Instruction in Rivers State University of Education Port Harcourt: An Assessment. The study was guided by the following research questions: i. to what extent do lecturers utilize Information and Communication Technology (ICT) in Smart class room, enhancing instruction? ii. Which of the ICT facilities are mostly utilized by the lecturers in their instruction? The design adopted for the study was descriptive. A sample of 207 was drawn from the population through stratified random sampling technique. The data collected for the study were analyzed using mean. The results show that very few of the lecturers utilize ICT facilities in their instruction.

**Turel, Y. K., and Johnson, T. E. (2012)** done a study on Interactive whiteboards (IWB) in Smart class room are regarded as one of the most revolutionary instructional technologies for various educational levels. While the impacts of IWBs in classroom settings have been examined recently in a number of studies, this study not only looks at the perception but also examines the actual usage and behaviours associated with
promising IWB features in practical settings. The main goal of this paper is to evaluate both teachers’ perceptions and their use of IWBs. A questionnaire was developed based on an extensive literature review as well as related instructional theories and models. The questionnaire consisted of questions about demographics, usage, and teachers’ perceptions related to IWBs. For this study, 174 teacher-participants, who have actively used IWBs for instruction, were selected from various educational levels (from grade 6 to 12). The results show that teachers believe that IWBs can be used for different subject domains. Also, teachers believe that IWBs can be used to facilitate learning and instruction under the following conditions, 1) collaboration with colleagues, 2) training about effective instructional strategies using IWB, and 3) more frequent teacher use of IWBs to improve IWB competency.

Jaasim Alazemi and Bader Alsuwaileh (2014) this study of Kuwaiti graduate students in the Education Department showed two main significant results where hypotheses were accepted. However, other findings were not statistically significant. Gender was found to have significant effect on the level of knowledge students have regarding the SMART boards, and that favours the female students over the males. Furthermore, speciality seems to have a significant effect on the knowledge of participants regarding SMART boards, the obvious explanation for that could be the fact that science topics are more technology based, leading to better knowledge. Implications can be withdrawn from this study, but careful consideration should be given to the sample size and the questionnaire construction (i.e. including more items) and conducting a factor analysis to
see whether latent variables exist. Such an analysis will only increase the understanding of SMART boards and their influence on students.

This study has several implications. It surely reflects gender disparities in knowledge of SMART boards, and hence policy makers and the University of Kuwait should consider improving the knowledge of male postgraduate students regarding the use of SMART boards. Most of the graduate students will work in the education system; hence it is vital for them to have sufficient knowledge in order to improve their pedagogic skills and their teaching capabilities. But before relying on this study, it is also important to consider a larger sample and other aspects of ICT and how these are related to knowledge and acceptance among students.

2.4 STUDIES ON TECHNOPHOBIA

2.4.1 INDIAN STUDIES

Selvaganapathi.R and P.Vaiyapuri Raja (2012) in their study titled “Technophobia of Higher Secondary School Teachers”. This study has been carried out to know about the “teachers” technophobia”. Many teachers do not use the available latest technology in teaching due to many reasons and one such reason is due to fear in using them and that fear which is irrational in nature is known as techno-phobia. Therefore, it is a felt need to study the techno-phobia of teachers and hence the authors decided to study the same. Technophobia scale (TPS) constructed and validated by Prabakaran, A.J.F(2006) was used in this study. As many as 300 teachers working in the higher secondary school situated in the Kumbakonam Taluk, Thanjavur District of Tamilnadu, India has been
selected as the sample. The findings revealed that the majority of the teachers are having relatively a low level of technophobia.

Laithangbam Pushparani Devi and Sanasam Bimol (2013) in their study title “Information Communication Technology: A New Horizon of Continuous Improvement in Teaching and Learning Process”. Technology plays a new dimension in changing the teaching and learning process. And the vision of an independent learner without constraints of time and space, is possible only when the systematic and effective implementation of ICT. The issues of continuous improvement in teaching and learning are brought together with a well design framework of ICT training and practice in a view of fundamental importance of lifelong learning in today’s information/knowledge society. The need to approach an importance of education the lifelong learning is an alternative means of continuous development in teaching and learning education. The concept of lifelong learning is a foundation for personal and community empowerment. Therefore, the importance of ICT in education is considering a means of continuous learning and improving the subject knowledge in the context of today’s’ information/knowledge society. Lifelong learning is become an essential part of global functioning in the 21st century. ICT taking an important role to play in continues development in education as a personal or as a whole.

Vinitha Johnson (2014) in her study titled “Women and the Internet” she says Women do not access and use the Internet to the extent or in ways that men do. In this small survey in South India, this generalisation was reinforced. Women are marginalised by
their own anxieties, roles and beliefs rooted in traditional norms as well as by illiteracy and economic circumstances. The media too are responsible for skewing women’s self-perceptions which hinder their use of the Internet.

**Farida Umrani and Rehana Ghadially (2015)** in their study titled “Gender and Decision-Making in Technology Adoption among Youth A Study of Computer Learners and Technophobia in India” they discuss about Computer adoption is tested by the Technology Acceptance Model (TAM) that theories how users come to accept and use a technology. The sample for the study consisted of 172 trainees (102 females, 70 males; mean age 21.34 years), enrolled in a one-year diploma course in computer applications and multilingual desktop publishing from three computer training centers in Mumbai. Data was collected after six weeks of computer training using standard psychological scales. Results of multiple regression analyses indicate that compared to the West, TAM offers limited explanation for adoption of computer technology by Indian youth. The article highlights the reasons for this in the light of constraints in resource availability and cultural differences. It is suggested that TAM has to be sensitive to the nature of the sample, nature of the technology and the cultural context of adoption to improve its predictive power. Perceived usefulness and subjective norm are the key factors in predicting future computer use. Hence, a model accounting for technology adoption in India should include a strong normative component to supplement the effect of usability. The gender comparisons indicate that TAM is a better predictor of computer adoption for females than males. Women make a balanced analysis of the technology that includes both productivity aspects and influence of significant others. However, what attitudes and
cognitive dimensions work in the Indian men to adopt computer technology remains to be further researched.

2.4.2 STUDIES DONE ABROAD

Larry D. Rosen, Deborah C. Sears and Michelle M. Weil (1993) in their study titled “Treating technophobia: A longitudinal evaluation of the computer phobia reduction program”. They describe a longitudinal evaluation of the Computer phobia Reduction Program. This program, aimed at reducing psychological reactions to computers and technology, includes two individualized treatment modules and one group treatment module to fit different types of computer phonics. One hundred and sixty-two students (clients) began one or more treatment modules while enrolled in a course that required computer interaction. Clients showed dramatic changes following the 5-week program, including decreased computer anxiety, improved computer cognitions, and enhanced computer attitudes. All treatment modules were equally successful in eliminating psychological reactions to computers. Two comparison studies added further support, showing that (a) clients evidenced a 50% reduction in dropout rate, an eightfold decrease in dropout rate, and a significant increase in graded performance in their computer course, and (b) clients had more marked changes in anxiety, cognitions, and knowledge in the 5-week program than comparable students in a variety of 10-week courses involving computer use. Finally, program dropouts were found to have more computer anxiety, more negative computer attitudes, and more negative computer cognitions than either the program clients or students who chose not to start a program module. Forty-one students were examined 6 months later and showed maintenance of program gains plus a
dramatic increase in computer knowledge and computer interaction. Perhaps most telling is that 50% of these former computerphobics would now consider a career involving computers. These results are discussed as evidence that computer phobia, whose roots are evident as early as childhood, can be treated successfully with brief, psychologically based intervention strategies.

Larry D. Rosen and Michelle M. Weil (1994) in their study titled “Computer availability, computer experience and technophobia among public school teachers” they discussed that, Since Time named the microcomputer their “Man of the Year” in 1983 there has been a continued drive for public school teachers to become computer literate. A nationwide study concluded that although teachers have increased computer availability in their classrooms, they are not integrating computers into the standard curricula. The present study examined “technophobia” as an explanation for low levels of computer utilization. Elementary teachers (N = 171), secondary science teachers (N = 117), and secondary humanities teachers (N = 200) in 54 schools across five urban school districts completed three measures of technophobia and a measure of demographic characteristics, computer/technology experience, computer availability, and current computer use. Results indicated that: (1) computers are available at all schools, but are not being used by many teachers; (2) many teachers are technophobic, particularly elementary teachers and secondary humanities teachers; (3) teachers are most worried about dealing with the actual computer machinery in their classroom, about computer errors, and about learning to use computers; and (4) predictive models showed that although computer experience is the most prominent predictor of technophobia, it is not
the only predictor age, gender, teaching experience, computer availability, ethnicity, and school socioeconomic status also play an important role in predicting technophobia. Implications of these results are discussed in terms of the long-term effects that technophobic teachers will have on their current and future students.

Michelle M. Weil and Larry D. Rosen (1995) in their study titled “The psychological impact of technology from a global perspective: A study of technological sophistication and technophobia in university students from twenty-three countries”. They examined technological sophistication and the level of technophobia in 3,392 first year university students in 38 universities from 23 countries. Technological sophistication was measured by the use of consumer technology (video-cassette recorders, microwave ovens, automated banking machines, computer/video games), university computing (classroom computers, word processing, programming languages, and library computers) and computer ownership. Technophobia was assessed by instruments measuring anxiety, cognitions and attitudes toward computer technology. Results indicated that many countries showed a majority of technophobic students while others showed very few technophobes. Consistent with expectations from prior research, age and gender were only mildly correlated with technophobia in less than one-fourth of the countries and computer/technology experience was negatively related to technophobia in the majority of country samples. Male students had more computer/technology experience than female students in half the samples. Technological sophistication varied greatly. A Discriminate Function Analysis indicated that two variables, a composite computer/technology experience measure and a composite technophobia score, were sufficient to provide
maximal discrimination between the 23 country samples. Differences between country sample placements on this two-dimensional representation are discussed as a function of public attitudes toward technology, cultural characteristics, political climate, and computer use in the educational system and general availability of technological innovations.

**Yvonne Lam (2000)** in his study titled “Technophile vs. Technophobia: A Preliminary Look at Why Second-Language Teachers Do or Do Not Use Technology in Their Classrooms” he discussed that the Given increasing pressure exerted by technological developments on education, it is important to understand the perceived ‘technophobia’ of teachers and to determine whether fear is the underlying factor behind their decisions regarding technology. Oral interviews were conducted with 10 L2 teachers and analyzed for their content in light of the following questions: (1) what are the reasons behind L2 teachers' decisions to use technology for teaching? (2) Why do some L2 teachers choose not to use computers in their teaching? (3) What factors influence these decisions? The main reasons are related to the teacher's personal belief in technology's benefits, or lack thereof, rather than to a resistance to technology. This finding suggests that teachers are not really ‘technophobic’ and that institutions are perhaps overly ‘technophile’ in their rush to obtain the latest innovations without considering the needs of teachers and students.

**David Gilbert, Liz Lee Kelley and Maya Barton (2003)** in their study titled "Technophobia, gender influences and consumer decision-making for technology-related products" they discuss about the Mobile Internet technology (MIT) is an extension of the
Internet beyond the static terminal of the personal computer or television. It has been forecasted that by the end of 2005, there will be almost 500 million users of mobile commerce, generating more than $200 billion in revenues. Contributes to the body of knowledge on how to approach the study of MIT products. Proposes that consumer perceptions of MIT products can lead to dichotomous decision making and argues that the challenge for marketers is to harness and fit this dichotomy to the MIT product continuum through an understanding of consumer psychological and attribution factors. The overall findings indicate that technology anxiety correlates with demographic variables such as age, gender and academic qualifications. Therefore, the implications of the study are that technology product engineering and marketing should recognise the importance of: study of the psychosocial needs of technology products, human factors in engineering design which need to fit these needs; and developing product designs facilitating consumers' psychosocial needs.

2.5 STUDIES ON MODERN TECHNOLOGY

2.5.1 INDIAN STUDIES

Ranjit (1997) analysed the opinions of school teachers regarding the use of modern technology and computers in administrational, instructional, evaluation, and library purposes. The study was conducted among 310 secondary school teachers from 24 schools in Malappuram District of Kerala. From the analysis of four areas of computer applications, teachers showed comparatively low response for instructional uses of computer. So it was suggested to conduct rigorous in-service training programmers to develop more positive views to use computers in different areas of instruction.
A.N.Maheshwari and V.K.Raina (1998) in their study on “In service Training of primary Technology: An Indian Experience.” India has yet to achieve elementary education for all children. Among the centrally sponsored initiatives to improve education is Operation Blackboard, to provide sufficient teachers and buildings, Minimum levels of learning, which set achievement targets, and the special orientation program for primary school Teachers (SOPT).This article focuses on the last of these and describe the new technology used to train teachers so that the losses in transmission inherent in the cascade model are avoided.

Interactive Video technology involving the Indira Gandhi Open University and the Indian space Research Organization was used experimentally in seven day training courses for primary school teachers in 20 centers in Karnataka state, providing one-way video transmission and telephone feedback to experts from the centers. The responses from teachers and their trainers indicate considerable potential for the exploitation of new technology where argue numbers to teachers require training.

Objectives:

➢ It concluded that the teachers and their trainers indicate considerable potential for the exploitation of new technology where large numbers of teachers require training.

Findings:

➢ The new technology may train teachers so that the losses in transmission inherent in the cascade model are avoided.
Shyni (2000) analyzed the views of secondary and higher secondary school teachers regarding the use of computers and modern technology in education. 160 secondary school teachers and 155 higher secondary school teachers participated in the study. It was identified both strata of teachers have almost similar views regarding the use of computers and modern technology in education. The study emphasized need for encouraging computer education and modern technology in schools and the need for making teachers competent to cope with recent changes in the field of computer technology.

Balasubramanian (2002) investigated about the need for computer education in teacher training programmers, both pre-and in-service teacher education. The study recommended that all teacher educational institutions and training programmers have to include computers as an integral part of their instructional aides. The study also identified that most private schools were comfortably placed in the accessibility of computers, but the same cannot be said about government schools. The study concluded with an urgency of computer literacy among schoolteachers and also recommended longer training programmers to prepare teachers to develop instructional software for their students.

Rajagopalan (2002) investigated about teaching strategies and modern technology adopted by schoolteachers and their pupil’s achievement. The study was conducted among 50 secondary school Malayalam teachers and 400 pupils. The study revealed that well experienced teachers especially in government schools were not using preferred teaching strategies and modern technology for imparting effective attainment of the
objectives envisaged through language education. The study indicated about the absence of timely implementation of in-service teacher training programmes that created lack of familiarization among teachers with effective and new instructional strategies.

Diane D. Painter, Ph.D Elizabeth Whiting and Brenda Wolters (2005) in their study titled “The use of an interactive whiteboard in promoting interactive teaching and learning.”

In looking at how the use of whiteboard technology can be used to improve our pedagogy skills, we wanted to determine how this forms of technology taps into the various multiple intelligence and learning styles of our students. Specifically, we wanted to learn what happens when the ACTIVE board is used to promote interactive learning and how it can be used in the development of literacy, problem solving, and creativity and collaboration skills with our students. Our findings are reported in their areas: lesson delivery student and observer reactions and the nine instructional strategies.

Objectives:

➢ To determine how this form of technology taps into the various multiple intelligence and learning styles of our students.

Findings:

➢ Findings are reported that the technology taps into three areas: lesson delivery student and observer reactions, and the nine instructional strategies.
Karpaga Kumaravel and Ramakrishnan (2005) conducted a study on Web access and usage behavior of teacher educators and student teachers. Objectives: The objectives of the present study were to investigate the following issues: (i) the frequency of access. (ii) The purpose of accessing web. (iii) Web searching skills possessed. (iv) Web searching methods. (v) The difficulties faced while surfing and (VI) The evaluation of the information obtained from the web. Method: The survey was conducted among teacher educators and student teachers from U.P., New Delhi and Rajasthan. To avoid the rural, urban bias, all the three places were having the city background. To avoid the effect of the rural/urban difference, all the three places were chosen as big cities where internet facilities are freely available. The survey questionnaire was sent to 100 teacher educator and 200 student teachers by main and e-mail. 77 teacher educators and 151 student teachers completed the questionnaire and returned. Out of them 75 teacher educators and 150 student teachers were selected as the sample. The survey method is used to gather information on how the teacher educators and student teachers access the web, their web searching skills, the difficulties face by them and the evaluation of the information obtained from the web. The authors in relation to that made a survey instrument. A questionnaire consisting of 6 sub questionnaire was made by the authors. Some sub questionnaire consisted of items on a 4 point Liker scale. Descriptive statistics frequencies, weighted mean, and S.D. analyzed the data collected. The major findings of the study stated that the frequency of Web access and usage was found to be high among the Teacher-educators whereas in the case of Student-teachers was above average.
Thiyagu (2006) conducted a study on the effectiveness of web-based instruction in learning mathematics education among teacher trainees. The following are the objectives of the present study: a) To identify a web site address on the selected contents, b) To validate the identified web based instruction. c) To develop an achievement test in Mathematical Education at Teacher Trainees based on the selected content. d) To find out the effectiveness of web based instruction in learning mathematical education over the conventional teaching methods. The pre-test and post-test equivalent group design was used. 40 teacher trainees from Pudukkotai area were selected also sample. ‘t’-test, standard deviation, chi-square test were the statistical procedures used in this research. The major findings were: There is significant difference in mean achievement scores between the students taught through traditional method and by taught through web-based instruction. Web based instruction has brought about positive impact on learning outcomes. There is no significant difference in achievement scores between the experimental boys and control boys. And there is significant difference in achievement scores between the experimental girls and control girls. Hence the experimental girls have higher mean scores than the control group girls. There is no significant difference in achievement scores between the experimental and control group students based on their age below 25. and there is significant difference in achievement scores between the experimental and control group students based on their age above 25. There is no significant difference in achievement scores between the experimental arts students and control arts students. Similarly there is no significant difference in achievement scores between the experimental vocational students and control vocational students. There is significant
difference in achievement scores between the experimental science students and control science students.

**Robertson, Carrie, Kattelmann, Kendra, Ren, Cuirong (2007)** in their study on “Control of type 2 Diabetes Mellitus using interactive internet-based support on a northern plains Indian Reservation; A Pilot Study”. With a high incidence of type 2 diabetes in indigenous populations and limited access to healthcare, an interactive website may improve disease control. Input from Northern Plains; tribe members were used for the creation of a culturally sensitive web site. The site was implemented for 24 weeks, with data collected at baseline and follow-up. Hemoglobin Alc (HbA1c), exercise, diet, cultural activities, and social activities were recorded by participants and tested for statistical significance to assess the effectiveness of the program. Control of HbA1c was better in the intervention group than in the control group (p=.025), suggesting improved disease control and program effectiveness.

**Objectives:**

- Interactive Internet –website may improve disease control.

**Findings:**

- It’s concluded that the intervention group is better than control group and the experiment group has improved disease control and program effectiveness.

This research explores the deployment of model lessons through digital video as part of an inservice effort to engage teachers in government and private rural Indian schools and non-formal educational setting. Our mixed method design combined tests of skills in English and math with participant observation and videotaping of English and math instruction for 100 children in 3 rural schools and 1 on-formal setting over eight months.

In this paper we present analyses of test score data and interactional patterns, followed by a qualitative examination of how one teacher appropriated pedagogical and subject matter knowledge from the model video lessons. Specifically, the data show gains in test scores of subject matter knowledge: children in classes that were part of the intervention scored almost 400% higher in English and almost 300% higher in math than did children in comparison school.

There were changes as well in classroom interactional patterns suggesting that teachers became more students centered in their approaches. The qualitative data illustrate how one teacher used and learned from the model lessons over time—for example, acquiring pedagogical strategies for interacting with the children and learning to connect classroom topics to the children’s local social worlds. Most generally, the data demonstrate how a network of teachers, schools, computer professionals, and teacher educations can reconfigure flows of information, tools, people, and texts, creating a band of geospatial opportunity within which the educational and social spaces of inhabitants of remote
villagers can be improved allowing them hopeful entry to some of the advantages of a digital information age.

**Objectives:**

- It explores the deployment of model lessons through digital video as part of an in service effort to engage teachers in government and private rural Indian schools and non-formal educational settings.

**Findings:**

- It concluded that teachers became more students–centered in their approaches.
- It resulted that the teachers, schools, computer professionals, and teacher educators can reconfigure flows of information, tools, people, and text creating a band of geospatial opportunity within which the educational and social spaces.

Nicole B. Kersting, Karen B. Givvin, Francisco L. Sotelo, and James W. Stigler (2010) conducted study on “Teachers analyses of classroom Video Predict student Learning of Mathematics: Further Explorations of a Novel Measure of Teacher Knowledge”. This study explores the relationship between teacher knowledge and student learning in the area of mathematics by developing and evaluating an innovative approach to assessing teacher knowledge. This approach is based on teacher’s analyses of classroom video clips. Teachers watched 13 video clips of classroom instruction and then provided written comments on the interactions of the teacher, students, and content. The quality of teachers analyses, coded using an objective rubric, are shown to be reliable and valid,
relating both to another widely used measure of teacher knowledge and to teachers own students learning (from pre-to- posttest).

**Objectives:**

- It may explore the relationship between teacher knowledge and student learning in the area of mathematics by developing and evaluating an innovative approach to assessing teacher knowledge.

**Findings:**

- It supports the teacher to measure their own knowledge and to teachers own students learning activities.

**2.5.2 STUDIES DONE ABROAD**

**Branson, et al. (1973)** analyzed and assessed the use of Instructional Technology in the army schools and training centers of United States. The report derived at conclusion that the atmosphere within Army training system was conducive to the use of Instructional Technology, but the management personnel need training in the design and implementation of instructional models. The study also reported about a need of greater dissemination of successful programmers. Following recommendations were cited in the study viz., (i) resource personnel were to be trained to develop training models utilizing Instructional Technology, (ii) middle and upper management personnel were to be trained to prepared to administer the training programmers, (iii) systems for research, development, evaluation and dissemination in the areas of Instructional Technology and instructional systems were to be developed, and (iv) all instructional approaches used in training programmers were to be examined to determine the proper functions of each.
Zerrin Ayyaz Reis, Zekeriya Karadag (2004) conducted study on “3D method in computer Based instruction.” 3D Method denoted that” Differentiated education by Differentiated teachers with differentiated materials” As mentioned in the theories like ”Tiered Education”, “Differentiated Learning” and Multiple Intelligence theory”. Taking care of differences of individuals is becoming more important. Not only students, but also teachers are different individuals and need to be trained by giving a chance to show their differences. Besides that, these different teachers need different educational software when teaching the different students.

In this specific study, we organized a course to senior students of math education in Istanbul University and encourage the students to develop a sample of educational software. In this paper, the problems about designing this type of courses will be discussed, we will share our experience gained in this study and make suggestions to solve the possible problems and to design more effective” Computer Based Math Instruction” courses.

Objectives:

➢ It encourages the students to develop a sample of educational software.

Findings:

➢ It concluded that it helps the students to solve the possible problems and to design more effective “Computer Based Math Instruction” courses.

Challis and Di (2005) discusses the advances in computer based technologies and the emergence of e-Learning, there are unprecedented opportunities to reconsider assessment of learning (and, axiomatically, of teaching) and how this can be undertaken. One
approach is adaptive assessment. Although it has existed in the tertiary environment since the time of the oral examination, advanced technologies allow much fuller exploitation of the possibilities inherent in a dynamic system of testing that responds to the user. Having described the characteristics of adaptive assessment, this paper considers how it can achieve significant pedagogical aims within the sector. The paper differentiates between adaptive assessment to assist learning and adaptive assessment to assess achievement. How adaptive assessment can be put in place and salient issues, such as security and system integrity, when such assessment is used for credit, are then discussed. The paper concludes that the capability exists but it has yet to be exploited within higher education as a viable approach to assessment and as a contributor to quality learning.

Derek Glover, David Miller, Doug Averis and Victoria Door (2005) “The interactive whiteboard: a literature survey”. There has been an increasing awareness of the need to understand the match between technology and pedagogy in the development of interactive learning supported by the interactive whiteboard in schools in the United Kingdom. There is evidence that teachers are seeking some understanding of the research background and to this end a term from Keeled University has been working on three aspects of interactive whiteboard use “the management of change as the technology is introduced, the learning processes as teacher become more fluent with the hardware and software, and the development of interactivity as a feature of enhanced pedagogy.

There is comparatively little background or research literature available but the team have sought this out and offer an analysis of finding from a broad sweep of sources. These confirm that enhanced interactivity requires an understanding of the way in which both teachers and pupils gain from the use of the technology and demonstrate that there is
a progression at all levels in learning to use the equipment and associated software to educational advantage.

**Objectives:**

- It supports in the management of change as the technology is introduced, the learning processes as teachers become more fluent with the hardware and software, and the development of interactivity as a feature of enhanced pedagogy.

**Finding:**

- It confirmed that enhanced interactivity requires an understanding of the way in which both teachers and pupils gain from the use of the technology and demonstrate that there is a progression at all levels in learning to use the equipment and associated software to educational advantages.

Gary Beauchamp and John Parkinson (2005) in their study on “Beyond the wow factor: developing interactivity with the interactive whiteboard.” The use of interactive whiteboards in science lessons has the potential to support change in the way we teach. Once teachers become familiar with the various features offered by the technology, they need to consider how best to deploy them to create a positive learning environment. This article provides a basis for teachers to reflect on their practice and suggests a number of routines to promote greater interactivity.

**Objectives:**

- It science lessons the interactivity white boards has the potential to support change in teaching.
- It may provide a basis for teachers to reflect on their practice.
Findings:

- It concluded that a number of routines to promote greater interactivity.

Kennewell, S., (2005) conducted study on “Interactive teaching with interactive technology”. Some of the recent initiatives which aim to improve teaching and learning in schools in the UK have promoted the idea of interactive teaching. Other schemes promote the use of interactive technologies for learning, yet no strategy has been developed for linking the two policies or investigating how interactive technology supports interactive teaching. This paper examines different interpretations of interactive teaching, considers why such teaching is believed to be more effective than approaches which place the teacher in a different role, and analyses the evidence concerning its effectiveness.

IT discusses what advantages, if any, the use of ICT offers to teaching pursuing interactive teaching approaches in the classroom, and then characterizes the ways in which ICT needs to be integrated into teacher pedagogical content knowledge if it is to support a move from surface to deep interactive teaching. Using a number of case studies drawn from research in primary and secondary schools. It explores how interactive teaching can be supported and improved using interactive technologies in the classroom, it concludes by considering the implications for forthcoming research into ICT and interactive teaching.
Objectives:

➢ It may supports to improve teaching and learning in schools and interactive technology may support interactive teaching.

Findings:

➢ It concluded that the interactive teaching can be support and improved using interactive technologies in the classroom.

Victoria Armstrong, Sally Barnes, Rosemont Sutherland, Sarah Curran, Simon Mills and Ian Thompson (2005). Collaborative research project which aimed to capture, analyze and communicate the complex interactions between students, teachers and technology that occur in the classroom. Teachers and researchers used in innovative research design developed through the interactive education project (Sutherland et al. 2003). Video case studies were carried out in four classrooms, focusing on the use of interactive whiteboard technology for teaching and learning.

The case studies were analyzed using Studio code, an analytic tool which allows researchers to mark and code segments of video data into categories and themes. Teachers developed coding system drawing on the learning aims and objectives of their particular lessons. The case studies illustrate that the introduction of interactive whiteboards (IWBs) into the classroom involves much more than the physical installation of the board and software. Teachers are the critical agents in mediating the software, the integration of the software into the subject aims of the lesson and appropriate use of the IWB to promote quality interaction and interactivity.
Objectives:

- It could support in the integration of the software into the subject aims of the lesson and appropriate use of the IWB to promote quality interactions and interactivity.

Findings:

- The IWB could involve teachers, in this research partnership which provide one of the best ways of bridging the gap between academic research and classroom practice and digital video and associated analysis software have been powerful tools in facilitating this type of work.

Burnett, et al (2006) conducted a study on the transformative influence of new digital technology connections on the practical implications for transforming literacy in primary schools in U.K... Children’s’ digital texts were analyzed alongside interview and observational data were used for the study. The study revealed the emerging need for making primary school teachers to be equipped with latest digital technologies, to promote new literacy practices in the classrooms through production of new kinds of digital texts and new technology to offer children in classrooms, to explore broader notions of literacy, and new forms of communication and learning in primary classrooms. The study also documented the emergence of peer-based learning relationships and changing perceptions of teacher’s role.
Carmichael and Procter (2006) conducted a study on the use of electronic networking in primary and secondary schools in U.K. The survey was conducted among 250 teachers. The study discovered that while use of IT is a well-established element of classroom practice, teachers made less use of electronic networks. The study made comment that time is needed for in-service teachers to make sense of new practices for themselves. More in-service training to make teachers sense of new practices in ICT for themselves was recommended in the study. The study concluded that there is still much to be done in the area of providing resources, services and online environments, which are supportive of innovation and knowledge creation about teaching and learning.

Celia Hoyles (2006) conducted a study on “Transforming the practices of learners and teachers through digital technology’. Drawing on the mass of evidence from research and practice, I will first set out what I see as the vision of the potential of information and communication Technologies (ICT) to transform the teaching and learning of mathematics. I suggest it can offer.

- Dynamic & visual tools that allow mathematics to be explored in a shared space-changing how mathematics is learned and taught.
- Tools –changing processing power that previously could only be undertaken by humans-changing the collective focus of attention during mathematics learning;
- New representational infrastructures for mathematics- changing construction and for student autonomy over their mathematical work;
➢ Connectivity – opening new opportunities for shared knowledge construction and for student autonomy over their mathematical work.

➢ Connections between school mathematics and learner’s agendas and culture- bridging the gap between school mathematics and problem solving in the real world.

➢ Some intelligent support to the teacher while learners are engaged in an exploratory environment.

Objectives:

➢ To Enable the students to do mathematics for themselves with the digital tools (before and alongside thinking about pedagogy and embedding in practice) thus allowing teachers, regardless of experience, the time and space to take on the role of learner.

Findings:

➢ Support the students to co-design activity sequences that embed the ICT tools and make explicit appropriate didactic strategies,

➢ Enable the student to try out iteratively in classrooms as a collective effort and debug together.

Peter Kent. (2006) in his study on “Using Interactive Whiteboards to Enhance Maths Teaching”. This article will describe the new style of pedagogy that was developed to take advantages of this technology with particular reference to teaching in a mathematics context. An interactive whiteboard set up involves the image generated by a computer
being projected onto a touch sensitive screen the size of conventional whiteboard, where
the touch of a pen is the equivalent to a mouse click. It is simply a touch screen computer
with a very large screen “its sum is greater than its parts (Glover 2001). Lee and Boyle
(2003) state, after nothing how the technology is now being employed at Richardson, the
generic term interactive whiteboard fails to communicate the immense education capacity
of the tool. In reality Richardson is using the technology as a large –scale, digital
convergence tool. IWBs have allowed teachers to take advantages of power of ICT within
the teaching component of the teaching and learning process in ways that they are just not
possible with the traditional personal computing approach to ICT in schools. The term e-
teaching has been coined to describe the new pedagogy that is evolving promoted by the
use of the IWBs. Succinctly, e-teaching involves the use of ICTs to enhance the art of
teaching.

Harnessing the potential of digital technology in presenting a concept exploring
implications, placing the concept in various contexts, creating links with existing
knowledge, and leading discussions that probe student understanding and allow students
to take their learning in personally relevant directions. E-Teaching is essentially a group
activity and so sits comfortable within a classroom. The group can range up to the size of
a normal class group. In this way e-teaching differs from conventional approach of
incorporating ICTs into teaching programs, where normally the activities are aimed at the
individual or small group.

E-Teaching is a move along the spectrum away from a didactical pedagogy to a
more interactive one. Students can not only interact with IWBs in ways that are simply
not possible with a standard whiteboard , they can also interact with the content and
context of the lessons by digitally capturing and manipulating their work and local
environment, incorporating it within the lesson and sharing it with the group. E-
Teaching involves teachers managing this convergence of digital information from a
wide range of sources and devices when presenting, discussing and reflecting upon a
concept with a class group. In an e—teaching context, a multi-literacy teaching and
learning environment is standard. The students experience with computer games and TV
enables them to easily relate with the multi-media, multi-sensory, multi—faceted style of
lessons, e-teaching promotes.

Objectives:

➢ It supports the teachers in managing this convergence of digital
information from a wide range of sources and devices when presenting,
discussing and reflecting upon a concept with a class group.

Findings:

➢ It enables the students to relate easily with the multi-media, multi-sensory,
multi-faceted style of lessons e-teaching promotes.

Nwachukwu Prince Ololube (2006) conducted a study on The Impact of Professional
and Non-professional Teachers’ ICT Competencies in Secondary Schools in Nigeria. The
objectives of the study to identify and evaluate the relevant strategies professional and
non-professional ICT instructional material utilization competencies play in stimulating
students’ academic achievement during and after instruction. The population comprises
of 10 (3.3%) principals, subject heads and teachers 270 (90%) from ten (10) randomly
selected secondary schools, as well as supervisors 20 (6.7%) from the Ministry of Education and Post Primary Schools Board. Out of the total number of respondents 76 (25.3%) were academically qualified, while 224 (74.7%) were professionally qualified. See figure 1 for the rest of the respondents’ background information. Four-point liker type scale (summated) of (4 = strongly agree; 3 = agree; 2 = disagree; and 1 = strongly disagree), which allows them to rate their perception on possible ICT material utilization competencies used as tool for this study. The statistical techniques used for the study are Mean and Standard Deviation, ANOVA and T-test of significance. The results of the findings points out that variety of techniques are needed for teachers to effectively utilize ICT instructional materials in the teaching and learning processes. The findings also revealed that there are significant differences in the effectiveness between professionally trained teachers and untrained teachers in their ICT instructional material utilization competencies.

Author Shenton and Linda Pagett, (2007) in their study “From bored to screen: the use of the interaction whiteboard for literacy in six primary classrooms in England”

In recent years, interactive white boards (IWBs) have been introduced into many primary classrooms in England. This enquiry examines the ways in which they are being used in the context of literacy teaching, in six primary classrooms in the south–west. Drawing on the perspectives of teachers and pupils, this report reflects on the impact of IWB use on the teaching and learning of literacy.

It concludes that, while use appears to have some general effects, such as supporting a more cross-curricular approach to literacy and raising the level of student engagement,
their use is not identical in all classrooms. In the classrooms studied, studied IWBs are used in various easy, according to teachers’ technical expertise and experience. To help more teachers towards effective use of the IWB, it is suggested that, rather than the top-down commercial or professional models of transmission training, teachers needs bottom-up approach that is more practitioner focused.

**Objectives:**

- The potential of IWB for effective teaching and learning was more obvious in subjects other than literacy. This research could suggest that if teachers take a more cross-curricular approach to teaching literacy, then the potential of IWB might be realized.

**Findings:**

- IWB could offer a multimodal approach to teaching literacy and, in practice; this research suggests that this potential is beginning to be realized.

**Dave Miller and Derek Glover (2007)** in their study on “Into the unknown: the professional development induction experience of secondary mathematics teachers using interactive whiteboard technology”. This article examines the approaches to professional development for staff in mathematics departments in seven secondary schools when interactive whiteboards were provided under a government funded project. The analysis is based on observation of video recorded lessons taught in the schools immediately after the technology was installed and again after two terms use. In this way, it was possible to complete a longitudinal study of change for a total of 22 staff in the schools for both sets
of recordings and to gather a narrative of their experience using a structured interview approach. Evidence suggests that the technology was either installed with minimum IWB training or installed with a general technological and pedagogic introduction or installed with continuous mentoring either from advisors or a missioner member of the departments. In those schools, characterized by the latter pattern, there appears to have been a more rapid progression from didactic to interactive teaching approaches and our conclusion is that effective interactive whiteboard teaching requires continuing professional development and specific personal coaching with a consideration whiteboard techniques and pedagogy.

**Objectives:**

- IWB could support for professional development and specific personal coaching with a consideration of both interactive whiteboard techniques and pedagogy.

**Findings:**

- It suggests that the introduction of technology without sufficient appropriate training in technology and teaching and learning may inhibit the realization of the full value of the equipment.

**Derek Glover, David, Miller, Douglas Averis, Victoria Door (2007)** in their study “The evolution of an effective pedagogy for teachers using the interactive whiteboard in mathematics and modern languages: an empirical analysis from the secondary sector.”
There has been considerable investment in the use of interactive whiteboard technology in schools in the UK. There is evidence that whilst teachers understand such technology, many do not understand the nature and implications of interactive learning. Observation and analysis of 50 video recorded lessons taught by successful teachers drawn from mathematics and modern foreign languages departments in secondary schools led to the classification of three types of practice representing a spectrum of increasing interactivity. The nature of this wrought by technology in approaches to learning and teaching, the investigation concluded that the use of new technology alone cannot lead to enhanced learning. Teachers also need training and develop awareness of the relationship between approaches to interactive learning and conceptual and cognitive development in subject’s area.

**Objectives:**

- The technology can support learning and show ingenuity in developing materials to meet specific learning needs.

**Findings:**

- Enable to prompt discussion, explain processes develop hypotheses or structures, and then to test by varied application.

S.Knnewell, H. Tanner, S.Jones, G.Beauchamp (2007) in their study on “Analyzing the use of interactive technology to implement interactive teaching”. Recent policy initiatives in England have focused on promoting interactive teaching in schools, with a clear expectation that this will lead to improvement in learning. This expectation is based on the perceived success of such approaches in other parts of the world. At the same time,
there has been a large investment in information and communication Technology (ICT) resources, and particularly in interactive whiteboard technology. This paper explores the idea of interactive teaching in relation to the interactive technology which might be used to support it.

It explains the development of a framework for the detailed analysis of teaching and learning in activity settings which is designed to represent the features and relationship involved in interactivity. When applied to a case study of interactive teaching during a lesson involving a variety of technology-based activities, the framework reveals a confusion of purpose in students’ use of ICT resources that limits the potential for learning when students are working independently. Discussion of relationship between technical and pedagogical interactivity points a way forward concerning greater focus on learning goals during activity in order to enable learners to be more autonomous in exploiting ICT’s affordances, and the conclusion identifies the variable and issues which need to be considered in future research which will illuminate this path.

**Objectives:**

- ICT could motivate the repetitive practice of skills when the teachers are not present: it is the characteristics of pedagogical interactivity that are more important in stimulating the reflection and intentionality of higher – order learning.

**Findings:**

- The IWB could support as a novelty in the lesson but in pedagogic terms it illustrates, rather than develops concepts.
It supports the students in searching for new approaches and co-operative activity between teachers who were learning from each other.

**Traci (2007)** carried out an investigation into the Comparative Effectiveness of Web-Based and Classroom Instruction: A Meta-Analysis. Method: Meta-analytic techniques were used to examine the effectiveness of Web based instruction (WBI) relative to classroom instruction (CI) and to examine moderators of the comparative effectiveness of the two delivery media. Findings: Overall the results indicate WBI is 60% more effective than CI for teaching declarative knowledge, the two delivery media are equally effective for teaching procedural knowledge, and trainees are equally satisfied with WBI and CI. However, WBI and CI were equally effective for teaching declarative knowledge when the same instructional methods were used to deliver the two courses, suggesting media effects are spurious and supporting Clark’s (1983, 1994) theory. Finally, WBI was 14% more effective than CI for teaching declarative knowledge when trainees were provided with control during WBI and in long training courses. Study limitations and directions for future research are discussed.

**Sue Hodge and Bill Anderson Epsom (2007)** conducted the study on “Teaching and learning with an interactive whiteboard: a teacher’s journey”. A self study methodology is used to explore the impact of introducing interactive whiteboard technology to primary school classroom. Several key insights, described as nodal moments, provided the impetus for the teacher to review her practice reconsider her students learning approaches and explore the relationship between the introduction of a new technology and the
teaching and learning that was occurring in her classroom. In particular she considers the
nature of engagement and the ways in which the technology initially moved her ways
from an active pedagogy.

Objectives:

➢ It enables the teacher to review her practice, reconsider her students
learning approaches and explore the relationship between the introduction
of a new technology and the teaching and learning that was occurring in
her classroom.

Findings

➢ IWBs have an impact on the area of learner affect, working in terms of
increasing motivation and task engagement.

IWBs have an impact on the nature of resource presentation and on learning processes,
potentially affecting the development of thinking skills, encoding and retention of
information and interaction between students.

Robert E.Slavin and Cynthia (2008) in their study on “Effective Programs in
Elementary Mathematics: A Best – Evidence Synthesis”. This article reviews research on
the achievement outcomes of three types of approaches to improving elementary
mathematics: mathematics curricula, computer-assisted instruction (CAI), and
instructional process programs. Study inclusion requirements included use of a
randomized or matched control group, study duration of at least 12 weeks, and
achievement measures not inherent to the experimental treatment. Eighty-seven studies
met these criteria, of which 36 used random assignment to treatments.
There was limited evidence supporting differential effects of various mathematics textbooks. Effects of CAI were moderate. The strongest positive effects were found for instructional process approaches such as forms of co-operative learning, classroom management and motivation programs, and supplemental tutoring programs. The review concludes that programs designed to change daily teaching practices appear to have more promise than those that deal primarily with curriculum or technology alone.

Objectives:

- The instructional process may approaches such as forms of cooperative learning, classroom management and motivation programs, and supplemental tutoring programs.

Findings:

- It concludes that programs designed to change daily teaching practice appear to have more promise than those that deal primarily with curriculum or technology alone.

Sue Bennett and Lori Lockyer (2008) in their study titled “A study of teacher’s integration of interactive whiteboards into four Australian primary school classrooms.” Interactive whiteboards (IWBs) have become increasingly available in Australian primary schools. However, little is known about how they are being integrated by teachers into their teaching practices. This paper report on a study of the introduction of IWBs into an Australian public primary school. Data were collected for one day per over two school terms, involving four classroom teachers. Data collected included a long of time allocation, lesson observations and a series of interviews with the teachers. The
study found that participants used IWBs to a varying extent over the course of a teaching week, with lessons that integrated the use of IWBs tending to focus on literacy and numeracy. The technology was readily incorporated into the classroom environment by teachers and considered easy to use. Teachers adopted a range of pedagogical approaches when using the IWBs and these approaches were consistent with those they usually employed in their teaching.

Objectives:

- Enable to know the five teaching situations such as direct instruction, adjunct instruction, facilitating the skills of learning, facilitating social skills and widening learner’s horizons.

Findings:

- It concluded that the teacher enable to know about the current work with five kinds of teaching in five context.

Wood, R. and Ashfiels J. (2008), conducted study on “The use of the interactive whiteboard for creative teaching and learning in literacy and mathematics: a case study”.

This paper considers the ways in which the interactive whiteboard may support and enhance pedagogic practice through whole-class teaching within literacy and numeracy. Data collected from observations of whole-class lessons, alongside individual interviews and focus group discussions with class teachers and initial teacher education students, has provided opportunities to consider the potential of such technology to facilitate a more creative approach to whole class-teaching.
The date suggests that, in the first instance the special features of information and communication technology such as interactivity, provisionality, speed, capacity and range enhance the delivery and pace of the session. This research seems to indicate that it is the skill and the development of pupil’s creative responses at the interface of technology, which is critical to the enhancement of the whole class teaching and learning processes.

**Objectives:**

- It may support and enhance pedagogic practice through whole–class teaching within literacy numeracy.
- It may develop the skill and the professional knowledge of the teacher who mediates the interaction, and facilitates the development of pupil’s creative responses

**Findings:**

- The IWB could support a teacher preferred style of whole – class interactive teaching.
- The IWB may be used to support teaching for creativity. The immediacy and adaptability of ICT encourages the testing of ideas through a process of hypothesis, analysis and reflection.

**David Miller and Derek Glover (2009)** in their study on “Interactive whiteboards in the web 2.0 classroom.” This article work underway to chart, critically evaluate, and systematize the introduction of interactive whiteboards (IWB) into modern foreign languages classroom in England. It is suggested that there is a developmental cycle whereby teachers take some time to understand the technology and become competent in its use. They then look to its advantages in presentation and the motivation of students
before becoming aware of its pedagogical value and develop a changed classroom practice.

This cycle is based upon enhanced teacher understanding of the nature of interactivity and the potential offered by the IWB in meeting a variety of learning needs. The relationship between IWB use and web 2.0 arises from the potential of both to add impetus for teachers to structure lesson development and enhance activity. It is supported by teacher understanding of questioning techniques, and increasingly, by consideration of the use of gestures at the IWB. While IWBs are not a solution to all learning problems, it is suggested that they offers scope for greater student involvement and understanding in the learning process.

**Objectives:**

- It supports the teacher in taking advantages in presentation and the motivation of students before becoming ware of its pedagogical value and develops a changed classroom practice.

**Findings:**

- It suggested that IWB offers scope for greater student involvement and understanding in the learning process.

Euline Cutrim Schmid (2009) in his study titled “The pedagogical potential of Interactive Whiteboards 2.0” The first part of this chapter discusses the transformative potential of interactive Whiteboards (IWBs), by analyzing the opportunities of using this technology in conjunction with web 2.0 tools to support constructivist practice in the languages classroom. The second part draws upon research data and literature review
results to examine the role played by teachers in the realization of this potential. A special focus has been placed on the various evaluating stages that teachers go through as they integrate IWB technology into their teaching. The research data derives from a case study conducted with nine English teachers from a secondary schools in Germany.

The study was conducted within an interpretative research paradigm, and data were collected via qualitative research instrument, namely interviews, classroom observations and the video recording of one IWB training session. Research findings revealed that the teachers investigated were gradually becoming aware of the transformative potential of IWB technology.

**Objectives:**

- It may support in analyzing the opportunities of using this technology in conjunction with web2.0 tools to support constructivist practice in the languages classroom.
- It enables to examine the role played by teachers in the realization of this potential.

**Findings:**

- It concluded that the teachers investigated were gradually becoming aware of the transformative potential of IWB technology.

**David Longman and Malcolm Hughes, (2010)** in their study titled “Whole class Teaching Strategies and interactive Technology: towards a connectionist classroom” This paper outlines some implications for pupils learning and for teachers practice, of the much increased availability of interactive whiteboards (IWBs) in UK schools in the context of national educational agents for desirable characteristics of classroom teaching.
In an earlier paper (Hughes and Longman, 2005) the authors presented a critique of the concept of interactivity and connectionism in teaching and learning using IWB. That paper was based on preliminary video data gathered in secondary classroom.

In this paper, lessons are drawn from the outcomes of small-scale research project based in a Herefordshire primary school during the spring term of 2006. For one focus week and following training in recording and editing, class teachers and children were given unlimited and unstructured success to digital video recording equipment with a request to capture uses of the interactive whiteboard. Results of the study suggest that: there are advantages to this methodology in recording what happens in classrooms (Though technical improvements are suggested): that good teachers can be a become a little better even when novice users of the technology; and that the notion of the connectionist classroom and the implications of the use of connected digital technologies could be important in our understanding of how children learn.

Objectives:

➢ It enables the students to record and capture the uses of the interactive white board and suggestion will be provided.

Findings:

➢ It concluded that good teachers can become a little better even novice users of the technology; and that the notion of the connectionist classroom and the implications of the use of connected digital technologies could be important in our understanding of how children learn.
2.6 DISCUSSION

The findings of the various studies conducted in India revealed that Influence of Smart Classroom and Information Communication Technological components such as the Computer Aided Instruction, Video Assisted Instruction, Net Based Instruction, Multimedia packages and e-content development showed positive sign on the performance in the Teaching-learning process. In the case experimental study, Achievement scores of the Experimental group showed higher value than Control group. In a Survey type of research study conducted by Dodia (2012) on the Use of ICT in Smart classroom: Required Competency for Teachers, indicated that most of the ICT competencies are required to develop in Teacher-educators. A study conducted by Rajandran (2011) on Teachers’ views on Application of Information Technology in Teaching students indicated that majority of the teachers expressed their views to make use of digital resources. In another study conducted by Anandan & Venkateswaran (2011) on Awareness towards Computer Education among Teacher Trainees revealed that the Teacher Trainees have more awareness towards Computer Education and smart classroom and modern technology. In another study conducted by Ajatha (2010) on Internet Awareness, modern technology and Competence among High School Students and Teachers stated that Mahiti Sindhu Project has significantly enhanced the awareness and competence to use Internet and modern technology among high school students and Teachers who involved in the project. Similar findings were found in the studies conducted by Anandakumar & Anandan (2010); Neeraj Kaushik and Anita Sharma (2010); Noushad Husain (2010); Rajalaksmi & Anandan (2010); Siddique & Abraham (2010); Rafeedali (2009); Azim Premji Foundation and Vidya Bhawan Society (2008).
and so on. In the case of Experimental study conducted on Effectiveness of Computer Integrated Method and modern technology, the results revealed that there is significant difference in Achievement scores between Computer Integrated Method and Traditional Method, Jebamalar Anna Jothi (2012). Similar results were found in the related studies of Tholappan & Krishna Kumar (2012); Doddamani Giriyappa Channabasappa (2011); Thiyagu (2006); Dharshana (2005) and Singh (2005). In the experimental study conducted by Leela Gnanalet & Ramaakrishnan (2010) on the Effectiveness of Multimedia Programme in Teaching, they found that there is significant difference between the experimental and control group in the post-test mean scores. Similar results were found in the studies conducted by Harendra Singh & Mishra (2009); Nimavathi & Gnanadevan (2009); Subhashini (2009); Jebaraj & Mohansundaram (2008), Amutha (2007) and so on. The Investigator identified some of the studies related to Attitude. The study on Attitude towards ICT and technophobia among Student-teachers conducted by Mirunalini & Anandan (2012) has revealed that opinion on ICT and technophobia among Student-teachers was high. Similar findings were found in Muralidharan (2008) and Dhamija & Panda (2007). It is contradictory to the results found in the study of Gopal (2010) which stated average among the Student-teachers on e-learning. Regarding the study conducted on Teachers Attitude revealed that there is a positive relationship between teacher’s personality, attitude towards profession and teaching effectiveness of secondary school teachers on academic achievement students, Dakshinamurthy (2010). Similar results were found in Narayan Prasad Uniyal and Pandey (2008) and Joy (2007). The similar findings were found in Selvaraju & Pazhanivelu (2011) and Parvathamma & Sharanamma (2010). From the analysis of studies conducted abroad, the results of all the
studies were in support of utilization of Information Communication Technologies, Teaching Attitude and Technophobia. The study investigated by Jacobson Barineka Bina, Obomanu & Baribor Vikoo (2011) on Utilization of Information and Communication Technology for Quality Instruction I Rivers State University of Education Port Harcourt: An Assessment stated that very few lecturers utilise smart class room technology, ICT facilities in their Instruction. This is contradictory to the results obtained by Bee Theng Lau & Chia Hua Sim (2008) states that most of the teachers are positive with the use of ICT in school and they appreciate use of ICT in enhancing teaching and learning. In another study investigated by Sunday (2010) on the Impact of Information and Communication Technology (ICT) and modern technology on Teaching and Learning found out that ICT have great impact on Teaching and learning. Similar results were found in the studies of Nwachukwu Prince Ololube (2006); Whitely Michael (2006); Willem, et.al. (2006) and Sari Juntunen, et.al. (2005). The study related to Teachers’ Attitude conducted by Naser Jamil AlZaidiyeen, Leong Lai Mei & Fong Soon Fook (2010) on Teachers’ Attitudes and Levels of Technology Use in Classrooms revealed that the teachers hold positive attitude towards the use of ICT. Similar result was found out in the case of study conducted by Bulent Cavas, Pinar Cavas, Bahar Karaoglan and Tarik Kisla (2009). However, this result is contradictory to the study conducted by Rengarajan & Senthilnathan (2012) on Teacher-educators towards e-learning. On the study related to the Technophobia conducted by Richard Keith Rogers & Wallace (2011) on Predictors of Technology Integration in Education: A Study of Technophobia and Innovativeness in Teacher preparation indicated that the significant relationships were found between Computers based Technophobia, Innovativeness and Technology Integration. On the
review of the above research abstracts, the investigator got an idea on the previous researches conducted in the field of his research topic. No doubt, many of the researchers clarified and verified common myths and beliefs about factors related to Utilization of Information and Communication Technology in Classroom Instruction. The review of related literature helped the researcher from the methodological point of view. In addition, the review of the studies helped to get needed theoretical background to the investigator pertaining to the objectives of the study different sampling techniques development of tool, procedures of data collection and salient finding arrived in the researchers conducted by the predecessors. The Investigator could get a clear idea on Tool development, Data gathering technique and appropriate Statistical Techniques to be followed for his study etc. This analysis had paved way for the investigator to proceed successfully without any repetition or duplication.

2.7 CONCLUSION

Though there were studies conducted earlier in the area of present investigation, the review of available studies enabled the present investigator to plan the course of research and in the formulation of suitable hypotheses for study. This chapter helped the investigator to select the variable of the study method, research design and appropriate data gathering devices.