CHAPTER II

REVIEW OF RELATED LITERATURE

2.0 INTRODUCTION

This chapter is divided into two sections as an attempt to present the brief review of the related literature and studies in the areas of computer education that is relevant to the present study. The first section looks into studies on student’s attitude towards computer education. The second section looks into computer education in relation to their academic achievement. The literature reviews show diverse results of computer education and academic achievements. Review work that is presented in the study reflects research works mainly conducted abroad and few in India.

Its first use had teachers and students learning to program. Since then there has been an evolution of best practices. As software gained in sophistication, the computer became the tutor or surrogate teacher. Students followed the commands on the computer screen receiving rewards for the correct answers. They also began to learn through playing games and simple simulations. Teachers of writing discovered the value of using a word processor and soon students were writing more and revising with ease. Other teachers saw the value of the computer in creating a rich learning environment and had students using databases, spreadsheets presentation and research tools across all subject areas. Next the internet impacted technology use. Overtime there was volume of knowledge available to the students with access and network of people throughout the world that enhanced communication and the exchange of ideas. Real problem solving in collaborative groups became the norm in some classrooms. Online courses were available and students in rural areas had expanded learning opportunities in a variety of subject areas. Previously abstract
concepts could now be illustrated and manipulated because of technology advancement. A whole new learning has become possible.

2.1 STUDIES ON STUDENTS ATTITUDE TOWARDS COMPUTER EDUCATION CONDUCTED ABROAD

During the past four decades or so, since the introduction of the computer, a plethora of writings on various perspectives including attitudes toward computers in developed countries have appeared.

The use of computers in optional circumstances (Fann et al., 1989) leads to developing an attitude towards computer use. Different researches have been conducted on how users’ attitudes toward computers influence the future use of and behaviour toward computers (Fann, Lynch & Murranka, 1989; Woodrow, 1991; Levine & Donitsa-Schmidt, 1997). Students’ computer-related attitudes are also directly related to their prior experiences and use of computers (Levine & Donitsa-Schmidt, 1997). Acceptance of computers (Selwyn, 1997) as well as future subject enrolment at school and the attendant selected career path (Busch, 1995; Levine & Donitsa-Schmidt, 1997). According to Whitrow (1999) computer-related attitudes influence students’ desire to use computers, their desire to enroll in computer-related subjects and courses, and their choice of career path.

Ariffin, Nordin & Karim, (2000) made a research on what predicts attitude towards Computer? The study was conducted to examine the status of computer use and attitudes among secondary school students in Kedah Malaysia. It identified the relationships among the variables and the predictors of computer attitudes. It was found that there exist strong relationships between confidence in using computers and computer attitudes. Other variables, computer experience, perceived usefulness
and frequency of use also entered the equation, but turned out to be poor predictor of attitude toward computers. The results indicated that students had moderate level of confidence and attitude, but high level of perception toward computer usefulness. This indicated that the students have positive awareness of the importance of computer in doing their current work and also for their future advancement.

A research was carried out by Liu, (2003) on Factors that Influence Students’ Learning Attitudes towards Computer Courses for Technology and Vocational Institute students in Taiwan. The results found indicated that the interest motivation had direct (the most significant) effect on subjects’ learning attitudes, so did the school environment, employment, and trend variables, but the last one was a negative effect. The results could provide useful information for students and teachers in learning and teaching computer courses.

According to Noiwan, Piyawat, & Norcio, (2005) they stressed if students perceived the usefulness of computer and feel confident in using it, this will lead to more positive attitudes, thus tend to use computer more. Garland & Noyes, (2005) also found that confidence correlate positively towards computer attitude, whereas Gao, (2005) found that perceived usefulness is positively correlated with computer attitude. Besides computer experience, researchers also found that greater frequency of computer use leads to positive attitude Garlaand & Noyes, (2004), Teo, (2006). Since attitudes are learnt, they are moldable i.e. they change with experience of the stimulus objects and with social rules or institutions Binder & Niederle, (2007).

Bovee,Voogt & Meelissen (2005), research on Computer attitudes of primary and secondary students in South Africa investigated computer attitudes of 240 students from eight primary and secondary schools in South Africa. The student population of six of the eight schools that participated in the study was characterized
as middle or upper class. All eight schools used computers for educational purposes, although the availability and use of the computers differed. In contrast to most studies on gender differences and computer attitudes, no gender differences in computer attitudes were found. However, this study showed differences in computer attitudes between students from the upper/middle class schools and students from the township schools. The latter showed a less positive attitude towards computers, but more interest in computer-related careers compared with the students in the upper/middle class schools. The study found that computer access and experience, which was significantly lower in the township schools, was also related to computer attitude.

The research of Adebowale & Bada, (2009) on the Correlates of computer attitude among secondary school students in Lagos state, Nigeria found that gender had no significant influence on any of the three parameters but age seems to affect computer attitude and computer anxiety. Students in the vocational and commercial fields of study had better attitude towards the computer than those in the sciences and arts. In terms of predicting students computer attitudes, fields of study, computer self efficacy, gender and very low levels of computer anxiety were found to be the significant predictors of computer attitude.

The result of the study conducted by Wong, Ibrahim, & Ayub, (2011) showed a positive correlation between computer attitudes and learning strategies. Students who have higher motivation and good time management tend to have more positive computer attitudes. Students who have the ability to process information, select main ideas and prepare for tests were more likely to have more positive computer attitudes as well.
Baran, Baran & Aslan, (2011) investigation of high school student’s computer attitudes in Terms of Certain variables was a study to research the role played by various factors (such as gender, the parents' level of education, level of income, the presence or not of a computer inside of the household, the type of school and class attended) in the attitudes towards computer of the students of different types of high schools. It found to demonstrate that, statistically speaking, the attitudes of students towards computer vary significantly according to the type of high school they attend. However, factors such as gender, the parents' level of education, the level of income, the presence of a computer in the household and the class attended were shown to not cause significant variation.

If students are to adopt computer technologies, they must have the right kind of attitudes toward computers.

2.2 STUDIES ON STUDENTS ATTITUDE TOWARDS COMPUTER EDUCATION CONDUCTED IN INDIA

Several researchers studied the stereotyping aspect of computer attitudes that computers are more suitable for boys than for girls, Shashaani & Khalili, (2001) found that female university students showed a stronger belief in equal gender ability and competence in computer use than males. Mumtaz (2001) found that primary school boys spent more time playing computer games whereas girls spent more time on the Internet e-mailing friends.

Das, I (2003), conducted his research on Computer Education in the Secondary Schools of Assam and that was students have a positive attitude and outlook, towards computer education received in their respective schools. Some students have suggested a revamping of the traditional modes of teaching by
introducing computers in teaching which they think will make their education more exciting and interesting. Teachers are confident about their knowledge of the subject; they are not devoid of anxiety. Majority of the students’ teacher recognition the important role that computers play in today’s society. The English medium student found to display higher level of confidence a sense of competences in their approach to and use of computers than the Assamese medium students. In spite of funding and all other infrastructural facilities provided by the North Eastern council in a collaborative venture with the Board of Secondary Education, Assam, nothing fruitful or lasting evolved from the course of computer education imparted to the students of government schools. Girls have a positive attitude towards computer as being more users friendly and express less anxiety about the use of computers.

The findings of Murthy (2005) on Attitudes toward Computers, the Introductory Course and Recruiting New Majors: Preliminary Results. In order to investigate reasons contributing to the decline in enrollment in computing programs in colleges and universities. What was found indicated that statistically significant decreases in positive attitudes toward computers through the first 3 measures (2/3 of the course), there was a statistically non-significant rise at the end of the course once the programming part of the course was completed. The conclusion was the initial enthusiasm for computers, which may come from familiarity with using computers for recreational activities, drops rapidly as the work of learning computing concepts and skill begins.

A research conducted in Karnataka by Kumar, (2012) on computer attitude among secondary school students of Bangalore city aimed to investigate the computer attitude among secondary school students. It revealed that Computer Anxiety, Computer Confidence and Computer Attitude were not significant among
Genders of secondary school students though computer anxiety very significant among senior and junior secondary school students.

Aziz & Hassan, (2012) carried a research which attempted to explore the factors that effect student’s attitude towards computers in Punjab. Affect of student’s gender, physical facilities for computer science available to them at colleges and the qualification of the teachers teaching them was analyzed by applying t test and one way ANOVA. Research findings indicated the positive affect with sufficient physical facilities and computer graduate teachers on student’s attitude towards computer. In this study female students showed better results than males. It was also found that there was a significant difference regarding attitude towards computers among students taught by teachers with different qualifications.

The research of Suri & Sharma, (2013) carried out a study on The Impact of Gender on Attitude towards Computer Technology and ELearning: An Exploratory Study of Punjab University, India. The study aimed to understand the relationship between gender and attitude towards e-learning. The results showed that no significant relationship exists between gender and attitude towards computer and e-learning. The usage of various e-learning forms also showed a non-significant relationship with gender. The hypothesis tested to see the effect of gender on forms of e-learning also showed that the usage of tool/form of e learning has no impact of gender. This implies the university can think about applying the e-learning format as the students irrespective of their gender are receptive towards the various forms of e-learning.

Finally, it is important to include a separate research finding at this point even though it is not a direct finding on creating new learning environments. Research over at least two decades Shashaani, (1994) has shown that student
attitudes toward computers can differ dramatically depending on a number of student characteristics, particularly gender and socio-economic status. Generally, more efficacious attitudes toward computers were found among boys and among students with regular access at home.

CONCLUSION:
From the literature review on studies of attitude towards computer education abroad and in India indicated that the students have positive awareness of the importance of computer in doing their current work and also for their future advancement (Ariffin, Nordin & Karim, 2000; Liu, 2003; Noiwan, Piyawat, & Norcio, 2005; Garland & Noyes, 2005). Confidence correlate positively towards computer attitude,( Gao, 2005; Teo, 2006 ; Wong, Ibrahim, & Ayub,2011).Gender did not show any difference in computer attitude ( Adebowale & Bada, 2009; Baran, Baran & Aslan, 2011).Types of school showed no difference in attitude towards education in computer (Baran, Baran & Aslan, 2011).

Some study in India showed female were equal to male in competence of computer use (Shashaani & Khalili, 2001; Kumar, 2012; Suri & Sharma, 2013 ) but findings of (Shashaani, 1994) showed male had better computer attitude. On the other hand that of (Das, I, 2003;Aziz & Hassan, 2012) female showed better results than male.
2.3 COMPUTER EDUCATION IN RELATION TO THEIR ACADEMIC ACHIEVEMENT CONDUCTED ABROAD

Research in traditional classrooms has shown that technology can have a positive impact on student achievement, mastering computer technology and harnessing it for widespread and comprehensive use among the students is not an easy task. This becomes even more challenging when this technology is progressing and changing rapidly.

The results from a number of published studies on the relationship between computer use and academic achievement indicate that this technology can bolster student outcomes (Niemiec and Walberg, 1987; Dusen and Worthen, 1994; Christmann and Badgett, 1999). Other efforts, based on the work of Papert, (1980), focused on teaching of computer programming with the belief that it could foster cognitive development. It was the focus of a number of research studies for several years (Clements & Gullo, 1984; Clements, 1987; Clements & Nastasi, 1988, Keller, 1990; DeCorte, 1996), with evidence that a Logo programming environment fosters higher order thinking skills, develops creativity, and produces other desirable outcomes.

Vooght, (1987) carried out a research study to examine the performance and engagement in computer literacy of boys and girls. The results of the study showed that girls perform lower and are less engaged in computer literacy than boys. Research on sex differences in mathematics and science education shows that three factors are important for the design of action programs for girls. It also showed that these factors seem to be relevant for computer literacy too. It has been found that a positive attitude towards mathematics and physics is positively related to a positive attitude towards computer literacy. An examination of the relation between
performance in computer literacy and attitude towards mathematics and physics shows no differences in performance between boys and girls with a negative attitude towards mathematics and physics.

**Niemiec & Walberg, (1992)** in their research synthesis on computer-based instruction (CBI) calculated a positive average CBI effect on achievement of 0.42 standard deviations.

**Christmann, Badgett & Lucking, (1997)** in their meta-analysis of studies on computer-assisted instruction (CAI) estimated effect sizes for eight curricular areas. The authors calculated an overall mean effect size of 0.209 and mean effect sizes of 0.179 for mathematics achievement, and 0.262 for reading achievement. For English achievement, however, they found a negative (–0.420) effect size.

There have been a few attempts to conduct research in this new and difficult area. A case in point is the research conducted by Stevenson, (1998) in Beaufort, South Carolina. His evaluation of the Anytime, Anywhere Learning program in the Beaufort County School District showed a positive relationship between laptop computer usage and academic achievement using standardized test scores.

**Ravitz, Mergendoller & Rush, (2002)** in their study conducted found that there is a negative effect between uses of computers by students at school and school-wide achievement. Further, students who score better on standardized achievement tests are those who use computers more often at home, and less at school and also family income is related to the use of computer at home and school size. Within schools, students who have higher software capability scored higher on tests and also gained more score improvement. Residual gains on test scores were also related to their computer capability.
Sun & Bradley, (2003), University of Kentucky using the U.S. PISA results to investigate the relationship between school computer use and student academic performance found that students who used computers almost every day at school performed better than the students from the group who used computers between once a week and once a month, after controlling for students’ SES backgrounds. Students who had never used a computer at school were found to be highest achievers among all comparison groups. These findings suggest that frequency of computer use might not be a good indicator of academic achievement.

Cheema & Bo Zhang, (2003) conducted studies on the Quantity and quality of computer use and academic achievement: This study looked at the effect of both quantity and quality of computer use on achievement was used to predict academic achievement from quantity and quality of computer use while controlling for demographic differences such as gender, race, and socioeconomic status. The overall implication of the findings was that an individual demographic characteristic such as race and socioeconomic status remains some of the most important predictors of academic achievement. Although ICT use (quality and quantity) was also found to have a significant effect on achievement, its relative effect was smaller than that of the demographic predictors.

Fuchs & Woessmann, (2004) conducted a study on Computers and Student Learning: Bivariate and Multivariate evidence on the availability and use of Computers at home and school found that despite bivariate correlations that show a positive relationship, once family background and school characteristics are extensively controlled for the mere availability of computers at home is negatively related to student performance in math and reading, and the availability of computers at school is unrelated to student performance. By contrast, student
performance is positively related to the use of computers at home for accessing emails and web pages and to the availability of educational software at home. Finally, student performance shows an inverted U-shaped relationship with the extent of computer and internet use at school, rising with some use but falling again with a use of several times a week.

Hunley, Evans, Hachey, Krise, Rich & Schell, (2005), studied to investigate the relationship between adolescent computer use and academic achievement. The results showed no statistically significant relationship between time spent on the computer at home and grade point average, nor were there significant relationships between grade point average and the amount of time spent on homework or going out with friends.

Lei & Zhao, (2007) used a sample of 130 students from a middle school in Ohio to investigate the effect of quantity and quality of computer use on academic achievement. For quantity of use, they found that students who used computers for more than 3 hours per day experienced a decrease in achievement while students who spent 1 to 3 hours per day with computers experienced an increase. For quality, they found that not all types of tasks enhanced achievement. For instance, for their sample, involvement in tasks such as webpage construction and programming improved achievement whereas a task such as using Word to take notes had a negative effect on achievement. Although it included both quality and quantity of computer use, they did not control for demographic differences and their small sample prohibited generalization.

Hsiao-Shan, (2008), studied on the relationship between computer use and academic achievements to find if any relationship exists between computer use by teachers and students and the students’ academic achievement in math and reading.
for both traditional populations and English language learner (ELL) tenth graders. It was found that computers show a positive relationship for computers use to students’ learning, it took place at least one semester before the exam. The use of computers in the same semester of the exam did not show a relationship to academic achievement concluding that learning takes time. The other findings showed that using computers in the spring of ninth grade and the fall of tenth grade, prior to their exams in spring of tenth grade, showed positive relationship with both reading and math achievements. The study showed no statistically significant relationship between how often students use computers at school and their academic performance on either math or reading; however, there was a significant positive relationship between using the computer at home and the achievement in both math and reading.

Gamboa & Garcia-Sauza, (2011), conducted a study to test whether there was any difference in the effect of having access to a computer at home or at school. It is found that access and quality in use have a positive effect on student performance, and the marginal effect of access of computer at home is higher and statistically different than the marginal effect of no access of computer at home. It was also seen that the access to computer at school had a higher effect on the performance in sciences.

Fairlie & Robinson (2012), carried out a research on Experimental Evidence on the Effects of Home Computers on Academic Achievement among School children and found no evidence that home computers had an effect (either positive or negative) on any educational outcome, including grades, standardized test scores, or a host of other outcomes. The estimates are precise enough to rule out even modestly-sized positive or negative impacts as they did not find effects at
notable points in the distribution such as pass rates and meeting proficiency standards, throughout the distribution of post-treatment outcomes, pre-treatment achievement, or for subgroups pre-identified as potentially more likely to benefit.

2.4 STUDIES ON COMPUTER EDUCATION TOWARDS ACADEMIC ACHIEVEMENT CONDUCTED IN INDIA

There are very few Indian studies that have tackled the problem of school failure among children. Most studies have screened children and identified specific problems in them irrespective of their academic performance Shenoy, Kapur & Kaliaperumal, (1998). Confronted with the hopeless and frustrating examination process, many children find themselves under increasing stress, sandwiched between examination systems that focus on marks rather than achieving an ability to think and grow, many children of lower socioeconomic status drop out. In fact, poverty and scholastic underachievement are the two major reasons for drop out (Haq & Haq, 1999; Patel & Desouza, 2000). Drop out has a number of undesirable consequences including child labor and poor physical health of the child (Patel & DeSouza, 2000).

Khirwadker, (1998), conducted a research on development of computer software for learning Chemistry of standard XI from M.S. University of Baroda. The data was quantitative as well as qualitative including teachers and student’s opinion about the package. Analysis was done by ANOVA, ANCOVA and content analysis. It was found that the software package developed for teaching three units of standard XI Chemistry textbook of GSTB was effective in terms of students’ achievement. Also CAI was found to be time effective. The academic achievement
of student of experimental group was found to be affected by variables like IQ, academic motivation and understanding the content.

**Dange & Wahb, (2006),** carried a study on the Effectiveness of Computer Assisted Instruction on the Academic achievement of Class IX Student’s of Sri Aurobindo High School, Shimoga, Karnataka. It found that there was no significant difference between mean gain scores on experimental and control group of pre post. Moreover, there was no significant difference between mean gain scores of pre test and post test of control group. There was a significant difference between mean gain scores of pre test and post test of experimental group. There was significant difference between mean gain scores of post test of control and experimental group.

**Aggarwal, (2007),** research on A Study of the Effectiveness of Computer Based Learning Material on the Selected Chapters of Std. X Science where experimental design was employed for the study. Findings of the study showed that there was found a significant gain in achievement of the students through CBLM and the achievement of the experimented group was found significantly higher than that of the controlled group. The achievement of the students was found to be independent of their intelligence and computer awareness and the achievement of the students was found to be independent of the interaction between treatment and intelligence and treatment and computer awareness.

The use of computer among higher secondary students as related with academic achievement in computer science in the Thrissur district of Kerala, India of **Jomy (2009)** revealed that there was no significant relationship between the use of the computer with achievement in computer science of higher secondary students but students needed to improve.
However there showed difference in the use of computer between higher secondary students studying in science and arts subject. Compared to science, arts higher secondary students were better in use of computer. No difference in the Achievement in computer science was found between male and female students.

A study of attitude towards computer education among senior secondary school students in relation to gender, locality and academic stream was a research carried out by Sharma & Singh, (2013). The investigation was done by Descriptive survey method, what was found was no significant Academic Stream difference on the Attitude towards Computer Education among senior secondary school students.

Role of Interactive Multimedia for Enhancing Student’s Achievement and Retention is research of Sharma, (2013) which argues about the role of interactive multimedia and conventional direct method of teaching English in relation to student’s achievement and retention. It concluded that both the method taken for study are quite effective for teaching the English language to class VII students but however, out of these two methods, interactive multimedia method was found more suitable with respect to the marks achieved by them in English. When students were taught through, both direct conventional method & interactive multimedia method than it was found that the acquired retention was better in case of interactive multimedia method.

CONCLUSION:

From the research carried out the results of the study showed that girls perform lower and are less engaged in computer literacy than boys (Vooght, 1987). Students who use computers almost every day at school performed better than the students who use less (Ravitz, Mergendoller & Rush, 2002; Sun & Bradley,
2003; Fuchsludger & Woessmann, 2004; Cheema & Bo Zhang, 2003; Gamboa & Garcia-Sauza, 2011). (Lei & Zhao, 2007) found students who used computers for more than 3 hours per day experienced a decrease in achievement while students who spent 1 to 3 hours per day with computers experienced an increase. The study of (Hsiao-Shan, 2008; Fairlie & Robinson, 2012), showed no statistical significance between how often students use computers at school and their academic performance. (Hunley, Evans, Hachey, Krise, Rich & Schell, 2005), showed no statistically significant relationship between time spent on the computer at home and grade point. The study on the effectiveness of CAI was found to have positive effect on students’ academic achievement as of the study of (Khirwadker, 1998; Aggarwal, 2007). However, the study conducted by Jomy (2009) showed no significant relationship between the uses of the computer with Achievement in computer science of higher secondary students.