2.1 REVIEW OF RELATED LITERATURE

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 (Best, 1977). To make any research effective, the knowledge of all related literature is necessary. Though the research for reference material is time consuming, yet it is very useful and important step in research programme. The research worker should have an adequate familiarity with the library and other available sources. The familiarity with the related studies provides ideal theories, explanation or hypotheses valuable in formulating the problem. It not only suggests method of research appropriate to the solution of the problem but also locates comparative data useful in the interpretation of the result.

It is therefore important for a research worker to know previous research literature. In other words, the competent physician must keep abreast of the latest discoveries in the field of medicine. The careful students of education, the research worker and investigator should become familiar with location and uses of sources of educational information.

For any specific research to occupy the place in the development of a discipline, the researcher must thoroughly be familiar with both previous theory and research. To assure this familiarity a review of the research literature is done. It allows the researcher to know the amount of work done in the concerned area. The clarity of the problem is possible with the thorough understanding of the knowledge generation in the area of research. It provides the source for hypothesis. It avoids the replication. It suggests the method, procedure, sources of data and statistical technique appropriate to the solution of the problem. The review of the related literature provides some insight regarding strong points and limitation of the previous studies. It enables them to improve their own investigation and to arrive at the proper perspective of the study.

According to Koul(1994), review of related literature besides allowing the researcher to acquaint himself of current knowledge in the field or area in which the researcher is going to conduct the search, serves the following specific purpose:

1. The review of related literature enables the researcher to define the limit of his field.

   It helps the researcher to delimit and define her problem. The knowledge of related
literature brings the researcher upto date on the work which others have done and to state objectives clearly and concisely.

2. By reviewing the related literature, the researcher can avoid unfruitful and useless problem areas. He can select those areas in which positive findings are very likely to result and the endeavors would be likely to add the knowledge in the meaningful way.

3. Through the review of related literature, the researcher can avoid duplication of well established findings.

4. The review of related literature gives the researcher an understanding of the research, methodology which refers to the way the study is to be conducted.

5. The most important specific reason for viewing the related literature is to know about the recommendations of previous researches listed in their studies for further research.

Thus a careful review of the research journals, books, dissertations, thesis and other sources of information on the problem to be investigated is one of the important steps in the planning of any research study. With this in mind the investigator planned the review of the related literature in the areas of computer assisted instructions, environmental awareness and attitude towards environmental pollution and for this investigator divided the studies into different sections based on the research problem.

2.2 STUDIES RELATED TO COMPUTER ASSISTED INSTRUCTIONS

Review of the related literature related to C.A.I. is broadly categorized into two categories i.e. review of the literature of computer assisted instructions in science and review of the literature of computer assisted instructions in general subject.

2.2.1 STUDIES RELATED TO COMPUTER ASSISTED INSTRUCTIONS IN SCIENCE

Jeyamani P. (1991) conducted a research on effectiveness of simulation model of teaching through Computer Assisted Instruction. It was found that the experimental group obtained a higher mean than the control group. The sex wise comparison provides to be insignificant. There was no significant difference in learning level between Tamil medium and English medium students. On the basis of the research findings it was concluded that the
experimental group performed significantly better than the control group. Joshi C.L. (1992) conducted a research on the construction and try out of networks for some topics of physics for standard XII Science stream. It was found from the results obtained that there is a significant difference on mean achievement post test scores of pupils belonging to group A taught by computer networks and group B taught by traditional method. There is no significant difference on mean of post test scores of pupils of high achievers of group A and high achievers of group B. No significant difference on mean post test scores of pupils belonging to the high achievers of group A and pupils belonging to low achievers of group B. Significant difference is obtained on mean post test scores of pupils belonging to the high achievers of group B and pupils belonging to the low achievers of group A.

Park, Insun Hwang (1993) conducted research on Co-operative Learning and Individual Learning with Computer Assisted Instruction in an introductory University level Chemistry course. It was found that subjects who participated in cooperative learning performed better than subjects in the individual learning groups with Computer Assisted Instruction (CAI) in an introductory university-level chemistry course. High-ability level students and low-ability level students in cooperative learning group improved their performance more than high-ability or low-ability level individuals who worked alone with a computer in an introductory university level chemistry course. There was no significant difference on students' attitude between students who worked in the group use of computers and individual use of computers in an introductory university-level chemistry course. The majority of the students in the university level class showed positive co-operation on group work and positive attitude toward using computers in the classroom.

Sindhi, N.O. (1996) conducted a research on the construction and try out of multimedia package for the teaching of physics in standard XI. It was found that there is a significant difference between mean of pre test and post test scores of the experimental group. This shows the effectiveness of multimedia package. There is a significant difference between mean post test scores of controlled group and experimental group. This proves that the teaching through multimedia package is more effective in comparison to conventional method of instruction. There is no significant difference between the mean post test score and mean scores of retention test of experimental group. This shows that if the teaching is done through multimedia package then student can remember it for a longer time.
Phoolwala R.N. (1997) conducted a research on an inquiry into the utility and effectiveness of microcomputers in teaching science for standard X. It was found that the difference between the mean scores of pre test and post test of experimental group was significant. So it can be said that students can learn effectively through microcomputers. Students can learn science effectively through microcomputer than through traditional method. The students revealed highly favorable opinion towards science teaching through microcomputers.

Khirwadker, A. (1998) conducted a research on development of Computer Software for learning chemistry of standard XI. It was found that the software package developed for teaching three units of standard XI Chemistry textbook was effective in terms of students’ achievement. Also CAI was found to be time effective. The experimental group took 45 hour time in average to complete the three units of Chemistry. Later on the academic achievement of student of experimental group was found to be affected by variables like IQ, academic motivation and attitudes and lastly, majority of experimental group students had positive attitude about various aspects of software package especially regarding presentation of content, logical sequencing and language used for understanding the content. The school subject teacher always held the positive attitude.

Kadhiravan, S. (1999) conducted a research on effectiveness of Computer Assisted Instruction in relation to student’s use of Self-regulated Learning Strategies. It was found that among the instructional strategies, viz. Lecture method-LM, Computer Assisted Instruction -CAI and Computer Assisted Instruction with peer interaction-CAIPI, CAIPI was the most effective instructional strategy in terms of realizing the instructional objectives in physics at higher secondary stage. Among the three instructional strategies, CAIPI is the most effective one in terms of its effectiveness in realizing the instructional objectives in the context of content with low difficulty level. There was a significant difference among different instructional strategies, viz. LM, CAI and CAIPI in enhancing the students’ use of self regulated learning strategies-SRL strategies. CAI and CAIPI had some influence on students’ use of SRL strategies while lecture method had not. There was significant difference among the instructional strategies viz. LM, CAI and CAIPI in terms of their effectiveness in enhancing the retention of what was already learnt in physics. There was a differential effect on the cognitive development of the students in physics due to their use of self-regulated learning strategies.
Meera, S. (2000) conducted a research on relative effectiveness among different modes of Computer-based Instruction in relation to students’ Personality Traits. It was found that different modes of Computer based Instruction, viz. Drill, Practice and Simulation were more effective than conventional lecture method in realizing the instructional objectives in Biology at Class XI. Effectiveness of the conventional lecture method and the different modes of the Computer-based Instruction, viz. Tutorial, Drill and Practice and Simulation were not influenced by the learner’s personality. There was significant difference among the different modes of CBI (Computer-based Instruction), viz. Tutorial, Drill and Practice and Simulation in terms of their effectiveness in enhancing the retention of cognition as revealed by the learner’s performance in the retention test. There was significant difference among the different modes of Computer-based Instruction in enhancing retention of what students have already learnt.

Dalwadi, N. (2001) conducted a research on development of Computer Assisted Instructions in Science for the students of standard IX. The research is of an experimental type. The researcher conducted this study on the unit of ‘Light’. As a tool the researcher prepared Computer Assisted Instructions for collecting the data. CAI was found to be effective individualized instructional technique for teaching science to standard IX students. It helped the students to learn the topic of ‘Light’ and clarified the concepts. Students were found to have a positive opinion towards the developed CAI. Students opinion towards the CAI was found to be favorable as far as the statement related to the interest, mode of presentation, content clarity and the question asked in the CAI. Science teacher was found to have a positive opinion towards developed CAI. Also, the data analyzed revealed that teacher has given favorable statements regarding content, language clarity, mode of presentation, clarity in graphics and evaluation procedure in developed CAI.

Patel, R. (2001) conducted a research study of learning through Computer Assisted Learning Material in relation to selected production variables and contiguity. There has been found significant gain through interaction with the Computer Assisted Learning Material on Solar system and Magnet –Standard VIII through the computed correlated t values. The status of the CALM in terms of production variable and contiguity vis-à-vis achievement has been found quite higher, except on a few teaching points where there was need to improve upon graphics, mode of presentation, spatial contiguity of text and animation and temporal
contiguity of animation and narration.

Joy, B.H.H. and Manickam, L.S.S. (2002) conducted a research on Computer Assisted Instruction, Attitude of Teachers and correlates. It was found that there was no significant difference on the teacher competency in the pre and post scores or between the experimental and control group. But teacher competency was positively related to post knowledge in CAI of the experimental group. There was a significant difference between the groups in their attitude towards computer education. As a result of training in Computer Assisted Instruction (CAI), the attitude of the experimental group became more favorable towards computer education. There was correlation between age and attitude towards use of computer. There was significant difference in the pre and post scores of the experimental group on knowledge in CAI and attitude towards use of computer.

Vasanthi, A. and Hema, S. (2003) conducted a research on effectiveness of teaching Chemistry for 1 year B.E. students through Computer Assisted Instruction. It was found that there is significant difference between the mean gain score of the control group taught through Traditional teaching method-TTM and the experimental group administrated by the CAI in all units put together. There is no significant difference between the mean scores of pre test of control group taught through TTM and experimental group administrated by CAI in all units together (Electrochemical bonding). There is no significant difference between the mean scores of post test of control group taught through TTM and experimental group administrated by CAI in all units put together.

Tabassum, R. (2004) conducted research on effect of computer assisted instruction (CAI) on the secondary school students’ achievement in science. Analysis of data revealed that the students taught through computer-assisted instruction as supplementary strategy performed significantly better. The students with high achievement level showed better results than those with low achievement level when taught through computer-assisted instruction. The computer-assisted instruction was found equally effective for both male and female students.

Singh, B. (2005) conducted research on effectiveness of Computer Assisted Instruction for teaching Biology. It was found that both the lecture and CAI methods were effective in enhancing the learning about cells and tissues. While lecture method was more effective than CAI for teaching the cell, CAI was more effective than lecture method for teaching tissues.

Assisted Instructions on the Academic achievement of Class IX Student’s Physical Science. It was found that there were no significant difference between mean gain scores of experimental and control group of pre test. There was no significant difference between mean gain scores of pre test and post test of control group. There was 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.

Patel, Kinnary (2008) conducted research on Computer Assisted Instructions in Physics for the students of standard XI: An Experimental study. It was found that the study has resulted in the development of a CAI program on ‘motion in one dimension and two dimensions’ and ‘Laws of Motion’ for teaching Physics to the students of Class XI. The package was found significantly effective for the students of class XI of both the groups. Comparative effectiveness of the CAI method and the traditional method was measured by the experiment and CAI method was found more effective in terms of achievement scores. In relative effectiveness of the package, it was equally effective in teaching boys and girls. Students and teachers both revealed a favorable opinion towards CAI program.

Yusuf M.O. and Afolabi A.O. (2010) conducted a study on effects of computer assisted instruction (CAI) on secondary school students’ performance in biology. Also, the influence of gender on the performance of students exposed to CAI in individualised or cooperative learning settings package was examined. The findings of the study showed that the performance of students exposed to CAI either individually or cooperatively were better than their counterparts exposed to the conventional classroom instruction. However, no significant difference existed in the performance of male and female students exposed to CAI in either individual or cooperative settings. Based on the research findings recommendations were made on the need to develop relevant CAI packages for teaching biology in Nigerian secondary schools.

Mustafa B., Aslihan K., Turgay A. (2011) conducted a study on the Effect of Computer Assisted Instruction with Simulation in Science and Physics Activities on the Success of Students on the topic Electric Current. In the study pretest-posttest control group quasi-experimental method was used. 28 students of 11th grade in the department of chemistry in an industrial vocational school in Izmir-Konak formed the study group; later on one
experiment (n=14) and one control group (n=14) were formed of these students. 16 open-ended questions about electric current were prepared as data collection tool. Pretests were applied on groups a week before the application of activities. “Electric Current” was taught to experimental group using CAI technique and to control group with traditional teaching methods. Posttests were applied one week later the application of activities. In the analysis of data Mann Whitney U-test and Wilcoxon signed rank test which are both non-parametrical, were used. At the end of the study it was detected that of the two groups whose successes were the same at the beginning, experiment group students on whom CAI method was applied came out more successful than control group on whom traditional method was applied. It can be concluded that CAI technique increases the academic successes of students in the subject of “Electric Current”.

2.2.2 REVIEW OF THE RELATED LITERATURE IN OTHER SUBJECTS

Haley, Mary Lewis Purnell. (1991) conducted a study on effects of Computer-Assisted Instruction in Macroeconomics Education: An Experimental Course Design. Effectiveness of computer-assisted instructional materials on macroeconomic understanding was measured by administering four instructor-generated examinations. Results of the regression analysis showed no significant positive relationship between students' cognitive achievement in Principles of Macroeconomics and their use of computer-assisted instruction. The only independent variable that was consistently positively related to students' cognitive achievement in Principles of Macroeconomics was college grade point average. Males were shown to be superior to females in terms of cognitive achievement in macroeconomics.

Lamazares and Ivonne Mercedes, (1991) conducted a study on the effects of Computer-Assisted Instructions on the writing performance and writing anxiety of Community College Students. A statistical analysis of holistic scores revealed no significant differences between the CAI and comparison groups in writing performance, and no significant differences in the overall performance of the CAI group when writing on the computer as opposed to using paper and pencil. Analytical scores revealed that the content of the computer essays produced by the CAI group was rated significantly higher than the content of paper-and-pencil essays produced by the same group. Analysis of grammar and spelling, diction, organization and
sentence structure did not yield significant differences between the handwritten and computer essays. The CAI group’s writing anxiety became significantly lower than that of the comparison group. Observations by the researcher indicated positive student retention and attitudes toward the computer, and limitations in the study due to lack of technological training and resources. Developmental students did not seem overwhelmed by the new technology or unable to benefit from it, as demonstrated by the significantly reduced writing anxiety of the CAI group, and the significantly higher rated content of the computer essays. These results, though limited in generalizability, warrant further experimentation with developmental writing instruction, that integrates computer networks.

Singh, R.D., Ahluwalia, S.P. and Verma, S.K. (1991) conducted research on Teaching of Mathematics: Effectiveness of Computer Assisted Instruction (CAI) and Conventional method of instruction. The study centers upon the problem of the effectiveness of Computer Assisted Instructions and of the conventional method of instruction in teaching mathematics, in terms of achievement of mathematics and direction of change in attitude towards mathematics of male and female students. It was found that the students who used the computer scored significantly higher than those taught mathematics through the conventional method. The students who used the computer showed significantly highly favorable attitude towards mathematics than those who did not use the computer. Achievement in mathematics and change in attitude towards mathematics were found to be independent of the sex factor.

Toet, Joyce Anne. (1991) conducted a comparative study of two instructional modalities (CAI) and traditional method on the achievement level of Community College Students. Analysis of final data showed that the experimental groups achieved greater cognitive gains, only in Math 021 (basic math) they showed differences of a statistically significant level. The analysis showed no possibility of developing a prescriptive instrument for use as a guide for future students to choose either CAI or traditional classroom instruction based on demographic information and resulting mean cognitive gains. One finding of significant importance is the retention rates for CAI and Traditional classroom methodologies. The results show that students retain in the Computer Assisted Instructional methodology at an increased number to a statistically significant level in all classes studied (Beginning Algebra, English, Basic Writing, English, Reading improvement) with the exception of basic maths.

Gao, Yong Qiang, (1992) conducted a study on factors affecting use of Computer-Assisted
Instructions by selected Chinese University educators. Results of this study indicated a significant development of CAI in China in recent years. Most educators had positive attitudes toward CAI and more than half of them used CAI in their teaching. The study also found statistically significant differences between use of CAI and age and English level; age, rank, and computer experience were also correlated to use of CAI; all factors examined in this study were statistically significant related to use of CAI. Based on the findings of the study, recommendations were made for improvement and future research on CAI in China.

Rose, A.V. (1992) studied effectiveness of the Computer Assisted Instruction with special reference to underachievers. The study throws light on the application of Computer Assisted Instruction (CAI) and the Teacher Support System (TSS) for the optimum development of underachievers (UA). It was found that both the CAI strategies were superior to the traditional method of instruction and CAI with TSS was more effective than CAI without TSS for underachievers (UA). Except achievement level, all the other learner variables combined with the treatment had no interaction effect on the achievement score. There was no relationship between the post treatment scores and the variable ‘sex’, ‘locale’ and ‘achievement level’ of the experimental group. In the case of the variables IQ, study habits and Maths study attitude, the positive relationship between those variable and achievement at the pre treatment level was found to be cancelled at the post test. Similar results were obtained for underachievers.

Mahajan, (1994) studied the effectiveness of computer assisted instructions for teaching singular and plural at grade 2 and found CAI to be more effective than the traditional method.

Shah and Aggarwal (1994) conducted a research study to evaluate teachers attitude towards computer education as well as Computer Assisted Instructions (CAI). They found attitude positive in all the groups, though female teachers showed more positive attitude towards CAI.

Burton, Beatrice Spencer, (1995) conducted research on the effects of Computer-Assisted Instruction and other selected variables on the academic performance of adult students in Mathematics and Reading (CAI). It was found that the type of instruction had an influence on the academic performance of adult students on the maths and reading sections of the Test of Adult Basic Education- TABE. Adult students' age had no effect on their total scores on the TABE. Male and female adult students had similar scores on the total section of the TABE.
Ethnicity had some influence on the academic performance of adult students on the total section on the TABE. The more formal education adult students had obtained, the higher their scores were on the total section of the TABE.

Das A. (1998) conducted research exploring effectiveness of Computer Assisted Learning Materials on Rhymes in different Modes. Graphics text mode has been found comparatively weaker than the other modes in learning word meaning on rhymes in different modes. The one of the seven rhymes text mode has been found most effective in developing language ability. In the same rhymes, Graphics text music and graphics text mode in developing language abilities of the pupils has been used. In five out of seven rhymes no significant difference has been found in different modes for developing language ability of the pupils. In three out of seven rhymes text mode largely has been found comparatively weaker than other modes for comprehensive understanding, where as in one rhymes text mode has been found most effective for comprehensive understanding.

Zyoud, M. (1999) conducted research on development of Computer Assisted English Language Teaching for VIII standard students. The findings show that when the computer is used to its full potential it can create an atmosphere where the students can learn and interact with the computer without being afraid of the teacher’s presence. The computerized exercise can help the student become familiar with significant amount of vocabulary, grammar and comprehension because it provides effective individualized instruction.

Rivet, J.R. (2001) conducted research on students achievement in middle school Mathematics: Computer Assisted Instruction versus traditional Instruction. It was found in spite of variability in performance in individual types of fraction operations, the overall improvement scores were significantly greater in Computer Assisted classrooms than in the traditional classrooms. Further, in spite of the achievement difference between schools, the Computer Assisted classrooms performed better than the traditional classrooms at each school. Although the statistical analysis conducted revealed that there were no statistically significant difference rates between Computer Assisted Classrooms and traditional classrooms, in spite of marginally lower attendance rates in the Computer Assisted classrooms, overall improvement scores were significantly greater in Computer Assisted classrooms than in the traditional classrooms. In this study, students in the traditional classrooms on average improved 3 points on the 30 points post test while students in the
Computer Assisted classroom on average improved 4 points. This signifies a 33% achievements benefit. Thus, 33% increase in student achievement was gained in classrooms utilizing Computer Assisted Instruction as opposed to those utilizing traditional instructional technique.

Hodge, J. E. (2002) conducted research on the effect of Maths anxiety, Maths Self-Efficacy and Computer Assisted Instructions on the ability of undergraduate nursing students to calculate drug dosages. It was found that although data analysis indicated that Maths anxiety was a factor in nursing students’ ability to calculate drug dosages, it was not statistically significant. On the other hand, Maths Self Efficacy and Computer Assisted Instructions showed statistically significant relationships with undergraduate nursing students’ ability to calculate drug dosages. Nursing educators must be aware of factors that effect drug dosage calculation abilities and errors including Math anxiety, Math Self-Efficacy and method of instructions.

Das, I. (2003) conducted research on computer education in the secondary schools of Assam. It was found that 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 of the important role that computers play in today’s society is high. 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.

Hsu, Yung-Chen (2003) conducted research on the effectiveness of Computer Assisted Instructions in Statistics education: A meta-analysis. Results of the meta-analysis indicate a small to medium positive effect of applying CAI in teaching college level introductory statistics on students’ achievement. The result of the analogous analysis of the variance
showed that different modes of CAI program produced significantly different effects on students’ achievement in learning statistics. Expert systems and drill and practice programs were the most effective modes and were followed by multimedia, tutorials and simulation. Computational statistical packages and web-based programs were the least effective modes. The teacher made CAI programs were significantly more effective than the commercially developed CAI programs. The effectiveness of CAI program in teaching statistics did not differ significantly according to the study characteristic of the publication year, the publication score, the educational level of participants, the level of interactivity of CAI program, the instructional role of CAI program and the sample size.

Jothikani, N and Thiagarajan, A.P.(2004) conducted research on effectiveness of Computer Assisted Instruction in Mathematics among B.Sc. Degree students. It was found that there is no significant difference between the mean scores of pre test for the control and experimental group in all six units with reference to the objectives such as knowledge, comprehension and application and their level of achievement such as Low, Average and High achievers. The mean scores of post test of control group are significantly higher than that of the experimental group in all six units with reference to the objectives and their level of achievement in both the years 1999-2000 and 2001-2002. The mean gain scores of the control group are significantly greater than that of experimental group in all six units with reference to the objective and their level of achievement in both the years 1999-2000 and 2001-2002. Hence, it is concluded that the conventional method is more effective and efficient than CAI method.

Joy, B.H.H. and Shaiju, S.L. (2004) conducted research on development of Computer Assisted Teaching Material in History at Higher Secondary Level and its effectiveness. It was found that both the lecture and computer assisted instruction methods led effective learning, the CAT method was found superior to the lecture method. There is no gender difference in the scores obtained.

Suwana, R. (2004) conducted research on effectiveness of Computer Assisted Instructions for Primary School Students: An Experimental study. The study has resulted in the development of Computer Assisted Instructional Program on selected five units of Thai language learning for the students of Pratom-3 and five units of Thai language learning for the students of Pratom-6. The Computer Assisted Instruction developed by the investigator
was found significantly effective in learning five topics of Thai subject to the student of Pratom-3 of experimental group – I belong to Buriram Kindergarten (t- value 8.62). The Computer Assisted Instruction developed by ONPEC was also found significantly effective in learning five topics of English subject to the students of Pratom – 3 of Experimental group – I belong to Buriram Kindergarten (t- value 8.60). On comparison of mean gain scores obtained for CAI developed by ONPEC in English language with CAI developed by the investigator in Thai language, the obtained t-value is 1.18. The Computer Assisted Instruction developed by the investigator was found significantly effective in learning five topics of Thai subject to the students of Pratom-6 of experimental group-II belong to Buriram Kindergarten. It was evaluated by teacher as a successful attempt. Opinion of students was found effective in presenting all the five topics of English and Thai language.

Cannon, T. R. (2005) conducted research on student success: a study of Computer –based instruction versus lecture based instruction in developmental Mathematics at a Tennessee Community College. When examining achievement, retention, persistence and success, the only area in this study that showed a significant difference was among the achievement rates. The lecture students’ achievement rates were significantly higher than the students who received computerized instruction. Retention, persistence and success did not show any significant difference between the two groups.

Rosales, J. S. (2005) conducted research on the effect of Computer Assisted Instruction on the Mathematics achievement of ninth-grade high school students in the lower Rio Grande valley. It was found that there is a statistically significant difference between the Mathematics achievement of ninth grade high school students in the lower Rio Grande Valley who have participated in Computer Assisted Instruction and the Mathematics achievement of ninth grade high school students in the lower Rio Grande Valley who did not participate in Computer Assisted Instruction. The resultant analysis indicated that there was statistically significant difference between the Mathematics achievements of the two groups.

Barnett, L. (2006) conducted research on the effect of Computer Assisted Instruction on the reading skills of emergent readers. It was found that students using Destination Reading did not benefit significantly from the use of the program compared to nonuser. The CAI group scored significantly lower on the initial sound fluency measure. Factorial ANOVA were used to compare DIBELS scores for effectiveness of the treatment, pre and post test comparisons
and interaction of treatment with test scores for the CAI compared with the nonuser group. T

distributions were used to analyze data from the Reading Running Record and Word

Recognition assessments. There were no significant differences between the CAI and non

user group. Teacher attitude toward computer did not affect students’ acquisitions of reading

skills, as survey responses were in the positive range for all participants.

Mehra, V. (2007) conducted research on teacher’s attitude towards Computer use

implications for emerging Technology implementation in Educational Institutions. The

purpose of this study was to determine the attitudes of school teachers of Chandigarh towards

use of computer technology for instructional purpose. The findings revealed the teachers

possessed fairly positive attitude towards computer uses but majority of the teachers need to

be provided training for using computers in instructional settings.


Aided Instructions: A Study of Student Evaluations and Academic Performance. This study

describes the educational use of CAI in two different courses at a small, private university

and the implementation and use experiences of the instructors. It was found that the

mechanics of using a CAI tool does not significantly impact the outcomes achieved by

students. The results for the CAI variable are, as expected, both positive and significant and

indicate that the use of CAI improves final exam scores. For the microeconomics course

only, the TIME variable is both positive and significant and added 4.846 points to the final

exam score in year two compared to year one. This indicates that with instructor experience,

the use of CAI may be more effective over time. Regression results indicate that CAI was not

significant in explaining the responses to any of the 10 student evaluation questions chosen.

This suggests that the use of CAI, in and of itself, does not impact student perceptions of

course quality. Alternatively, this may be due to the fact that the responses are not identified

by student, so the aggregated data masks any effect of CAI on student perceptions of course

quality. While the response differences are not large enough to be significant, at least for the

microeconomics course, they generally are positive indicating a possible improvement from

the use of CAI in student perceptions of course quality.

Patel, J. A, (2009) conducted research on development and Implementation of CAI to teach

English grammar to standard VIII student in different modes. The achievement of the

students in English Grammar taught through CAI was found significantly higher than that of
the students taught through traditional method. The achievement of the students taught through only CAI was found significantly higher in English Grammar than that of the students taught through traditional method. The achievement of the students taught through CAI with repetition and CAI with Discussion was found significantly higher than the achievement of the students who were taught through traditional method. From the three modes of the presentation of this CAI, the mode i.e. teaching through CAI with discussion was found significantly superior in comparison to other two modes. CAI was also found to be effective in terms of the students.

Patrick, L. Traynor, (2010) conducted research to determine the effect of CAI on the performance of different types of learners. Middle school students of various program types as special education, non English proficient, limited English proficient and regular education completed instructional units using a computer program. Regular education students were found to have made greater pretest post test gains than special education students using ANCOVA Test. The students showed significant pretest post test gains using dependent t test.

Susan, M. Bennett, (2012) conducted research on the effects of computer assisted instruction on rural algebra- i students .Results and conclusions from the studies indicated computer-assisted instruction to be beneficial for rural algebra students and provide an equitable education compared to students in other settings. Recommendations for improving the effectiveness of computer-assisted instruction include providing teachers with professional development, encouraging interaction in classes incorporating computer-assisted instruction, providing students with suitable technology, and selecting students with skills to work independently.

Ramani, P.and Patadia, H. (2012) studied the effectiveness of Computer Assisted Instruction in Teaching Arithmetic. This Experimental study compared academic performance of students in class VIII among traditional instruction, Computer Assisted Instruction (CAI) and Computer Assisted Instruction with simultaneous discussion. The design used in this study was pre test posttest group design Three sections of class VIII students were selected and groups were randomly allotted. ANCOVA was used in data analysis. There was significant difference in the post test scores of students receiving traditional method, only CAI and CAI with simultaneous discussion. It revealed that traditional method is as effective as only CAI.
CAI with simultaneous discussion is more effective than traditional method. CAI with simultaneous discussion is more effective than only CAI.

Adeyemi B. A (2012) studied the effect of Computer Assisted Instruction (CAI) on Students’ Achievement in Social Studies in Osun State, Nigeria. The study investigated the effect of Computer Assisted Instruction (CAI) on Junior Secondary School Students’ achievement in Social Studies. The study equally examined the interaction effects of treatment of academic ability on students’ achievement in Social Studies. The results indicated that there is no significant main effect of treatment (Computer Assisted Instruction and Conventional Methods) on student achievement in Social Studies. The result also revealed that there is significant main effect of academic ability on students’ achievement in Social Studies. The high academic ability students were significantly better than the low ability students in their achievement in Social Studies. The findings further revealed that there is no significant interaction effect of treatment and students’ academic ability in their achievement in Social Studies. Based on the findings of the study, recommendations were made among others, that conducive environment should be provided with adequate facilities for Computer Assisted Instruction (CAI) as a mode of instruction to be effectively utilized in schools.

Chhabra, S. and Dhamija, N. (2013) conducted comparative study of computer assisted instruction technique (CAI) and conventional teaching (CT) on the achievement of pupil teachers in methods of teaching English language. Educational Technology has made a significant contribution to education by taking into consideration the individual differences of learners and catering to their needs. The emerging trend the world over is towards more individualized and flexible forms of learning with an emphasis on individualized methods of instruction. This research is based on an experiment to study the effect of a new teaching methodology i.e. Computer Assisted Instruction Technique (CAI) in comparison to Conventional Teaching (CT) on the achievement of pupil teachers in methods of teaching English language. In this study, instructional material was developed for both methods of instructions i.e. CAI as well as for Conventional Teaching (CT). The instructional material for both the methods was developed and validated by the researcher. The experiment was carried out on the pupil teachers of B.Ed. class of a College of Education. Pretest- Posttest Control Group design was used. Results of the experiment showed that CAI was found effective in terms of the achievement of pupil teachers in methods of teaching English.
language at post-test stage. However, no significant difference was found to exist between the experimental group and control group at the pretest stage.

2.2.3 OBSERVATIONS OF RESEARCHES RELATED TO C.A.I.

After going through the educational research done regarding CAI in Science and other general subjects. Most of the studies conducted were related to the integration of the CAI with various subjects and technology either at school level or university level. The observations can be summarized as follows:

(i) From the reviewed literature it is clearly seen the CAI is an effective approach and has a great concern regarding learning in Science. It is found that the effectiveness of CAI is compared with traditional method in Science, CAI is superior than the traditional method.


(ii) The research studies were related with topics of branches of science like Physics, Biology and Chemistry at higher secondary as well as secondary level and it shows that well designed CAI is profound in learning.

(iii) Researches by Joshi C.L (1992), Sindhi, N.O. (1996), Phoolwala R.N. (1997), Patel, R. (2001), were conducted to see the effectiveness of the different method in science. These researches have been based on network diagram, microcomputer, multimedia package and CALM.


(v) In an analysis of attitude towards the use of CAI mostly all the students shows the favorable attitude toward the use of computer Singh, R.D.; Ahluwalia, S.P.; and Verma, S.K.
Both the methods i.e. CAI and Lecture Method were effective in enhancing the learning. But, on different topics relative effect were shown by both the methods. Singh, B. (2005). Students of non government schools learnt better through CAI as compared to students of government schools. Das, I. (2003)

There was no relationship found between post treatment scores on CAI and variable locale of the experimental group. Rose, A.V. (1992)


The teacher made CAI is more effective than the commercially developed CAI programs. Hsu, Yung-Chen (2003).

Girls have a positive attitude towards computer as being more users friendly and express less anxiety about the use of computers. Das, I. (2003)

Males were shown to be superior to females in terms of cognitive achievement. Haley, Mary Lewis Purnell. (1991).

CAI is effective in comparison of lecture method and was found to be effective in different mediums of teaching Jeyamani, P. (1991).
2.3 STUDIES RELATED TO ENVIRONMENTAL AWARENESS

Gupta et. at (1981) conducted a study of the environmental awareness among children of rural and urban school and non formal education centers in Bhopal. They found that the rural pupils belonging to formal stream had more environmental awareness than the urban pupils of the same stream and there was no significant difference in their environmental awareness.

Singh & Singh (1992) conducted a study on environmental awareness and postulated that our environmental has been so polluted that even free and vital gifts of nature like pure water and fresh water are increasingly becoming scare. Hence, environmental education naturally becomes the most pressing need of the day for not only mankind but also for animals and plant also.

Sudararjan and Rejeshkar (1993) conducted a study to prove that environmental awareness existed in all and difference in variables like location, sex, subject or socio-economic status matter little. It was found that environmental awareness of these higher secondary students in Tamil Nadu had not been influenced by the differences in location, sex, subject and socio-economic status.

Patel and Patel (1994) conducted a study to examine the effect of sex, area and experience on environmental awareness of the primary school teachers. It was found that male teachers of long school experience of urban area were more aware about the environmental education.

Khemani. R. (1998) studied the effect of sound pollution children. The results indicated that the children lose their micro sensitivity at a very early age. They are bombarded by noise, loud music and therefore develop loud voice while taking very early in the life, they lose an important function of their body.

Sudha Rani, K. and Ramesh, B. (1998) discussed the impact of industrialization on environment. As the survival of human being depends on their environmental awareness, maintenance of a healthy environment is essential. Industrial growth leads to rapid economic growth. At the same time, however industrialization cause environmental pollution in the atmosphere, in the hydrosphere, and in the lithosphere. Environmental
pollution, whether it is air, water or soil had dangerous and fatal consequences. Hence, pollution needs to be checked. Sometimes the pollutants are controlled at the source level. In addition to the application of the principle of 'dilute and disperse' and 'concentrate and contain ' a third method of 'recycling' is suggested for pollution abatement.

Pareek.M & Sidan, Ashok Kumar (1998) studied environmental awareness among males and females of secondary school students from urban and rural backgrounds. Result revealed (a) poor environmental awareness in 40 percent and greater environmental awareness among 60 percent of students (b) urban students manifested greater awareness than their rural counter parts, and c) boys and girls did not differ significantly in their cognitive level of environmental awareness.

Sharma, R. (1999) identified environmental stresses in the rapidly growing cities of India and made suggestions for their mitigation. The continuous influx of people from the countryside leads to environmental overloading of the existing ill-equipped and unplanned infrastructure. Environmental stressors include factors pertaining to the physical environment like air, water, noise pollution and traffic jams, as well as the psychological environment which include high level of competition, lack of social support and loss of social identity. Environmental stressors need to be addresses at two levels. Firstly by improving the physical environment and preventing further degradation through better city planning. Second at the psychosocial level by devising copying strategies to deal with the existing stressors through intervention programmes.

Jankavali ,C (2001) postulated that time is now at hand when we must stop exploiting nature for our satisfying needs and start living with nature by returning to it the materials, we have used by keeping our population in control and by following of nature. The most practical solutions to our environmental problem are those which involve recycling, using alternative sources of energy and significantly reducing all kinds of pollution in our ecosystem.

Sharma, Neeraj (2002) concluded that the students get the knowledge about the environmental issue not only through their curriculum experience & knowledge gained till in their class but the other means of awareness also have their influence of awareness. He found that the students through curriculum get the awareness about environmental
problem. Most of the students responded that they get awareness about their environmental problem through electronic and print media. Male and female students are equally aware about their environment. The difference between the percentage score of girls and boys was 2 which is very small so it can be neglected. From the percentage of responses of various questions, investigator came to know that question selected with air pollution get the highest percentage of right responses. Then comes the places of water, noise and soil pollution. It clearly indicates that students were more aware about air pollution than other types of pollution. If the people have awareness regarding their environment, only then they would develop positive attitude towards the environment especially towards environmental pollution.

Dhillon, J.S. and Sandhu, V. (2004) conducted research on Environmental Education Awareness among elementary school teachers. Results revealed significant variation in the environmental education awareness with regard to their residential background and subject specialization. There exists urban—rural variation in environmental education awareness. Teachers working in urban schools were more aware about environment and its related problems. Science teachers had significantly higher environmental education awareness than their social science and language counterparts. However, no significant variation was observed in relation to the sex of elementary school teachers thereby highlighting that sex was not the factor affecting environmental education awareness among the elementary school teachers.

Lenka, S.K. (2005) conducted research on Awareness of Environmental Education among the PG students. It was found that there is no significant difference in environmental awareness between male and female students. Science students were more aware about environment than arts and commerce students.

R Sahaya Mary, I Paul Raj (2005) conducted research on Environmental Awareness among high school students. It was found that medium of instruction in the school and locality of the school influence the environmental awareness among the students. Gender, type of the family and size of the family do not affect the environmental awareness among the students. The different type of schools and different type of religions do not affect the awareness among the students. The caste of the students within the group
affects the environmental awareness among the students. Environmental awareness among the high school students is above average.

Prahallada, N. N. and Shobeiri, S.M. (2006) conducted research on environmental awareness among secondary school students in India and Iran. Results revealed that more than 70 percent of students in both the countries had high level of environmental awareness. Indian students with an average level of environmental awareness are more than their counterparts in Iran. The number of Iranian students with high level of environmental awareness is more than Indian students. Boy and girl students in this study have the same level of environmental awareness and gender is not a factor which affects their environmental awareness. The type of school management has an impact on environmental awareness of students in both the countries. Iranian government school students scored significantly higher than their counterparts in India on environmental awareness.

Suresh, S. and Kadhiravan (2007) conducted research on influence of personality on the environmental awareness ability of college students. The findings of the study revealed that environmental awareness ability is affected by demographic variables such as subject of specialization, residential area, parental income and parent’s level of education. Gender does not affect the personality of the students whereas subject specialization, residential area, parental income and parent’s level of education significantly influence certain dimensions of personality. It is observed that the sensing and feeling of an individual have significant influence upon their environmental awareness ability.

Sharma N. K. (2009) conducted research on a study on Environmental Awareness of college students in relation to sex, rural- urban background and academic streams. The findings of the study revealed that there is no significant difference in environmental awareness ability of male and female students, both possess equal level of environmental awareness. Science students possess high environmental awareness ability. There is significant difference in environmental awareness ability of rural and urban students in favour of urban students.

Sengupta, M. , J. D. and M. P. K.(2010) conducted research to understand the effect of Stream (Arts, Science and Commerce) and Gender on Twelfth Grade Students’ Environmental Awareness and Environment Related Behaviour in Kolkata. The result
has shown that environmental awareness is significant source of variation for environment related behaviour. However, gender is not a significant factor in this regard. But stream is observed to be significant source of variation in case of environment related behaviour. The difference between the two groups is significant in the context of environmental awareness. Statistically significant difference was observed between the scores of arts and commerce students in the context of both environmental awareness and environment related behavior. The results obtained in case of science and commerce students are different. No significant F values were found in relation to environmental behaviour and environmental awareness scores of the science and commerce students. The present study’s observation on the effect of streams or courses of higher secondary syllabus is somewhat different. Unlike other findings it showed that science students’ scores on environmental awareness and behaviour were less than that of arts students. Another important finding was the effect of gender on the two variables. The girl students are observed to be more environmentally aware although the gender has no effect on environment related behaviour.

Astalin P. K. (2011) conducted research on study of environmental awareness among higher secondary students and some educational factors affecting it. Main findings of this study are the students of 11th and 12th standard were identical as far as their environmental awareness was concerned. Science stream students had more environmental awareness in comparison to arts stream students. The CBSE students had more environmental awareness in comparison to UP Board students. Parent’s group of students belonging to literate, undergraduate, post graduate and research had more environmental awareness in comparison to parent’s group of students belonging to high school and intermediate. Finally the male students had also more environmental awareness in comparison to female students.

Arunkumar, J.(2012) conducted research on a study on assessment of environmental awareness among teacher trainees in teacher training institutes for the study. The major finding of study reveals that teacher trainees in Tiruchirapalli district have average level of environmental awareness with regard to back ground variables such as gender, locality and teaching competence. The level of environmental awareness of teacher trainees in teacher training institutes in Trichy and its dimensions is average. The level of
participation in extension activities of teacher trainees in teacher training institutes in Trichy is average. The level of participation in extension activities of teacher trainees in teacher training institutes in Trichy is average. The level of environmental awareness of teacher trainees in teacher training institutes in Trichy with regard to their gender is average.

Singh, A., Kumari, S. and Singh ,J.(2014) conducted a comparative study of Environmental Awareness among secondary school teachers in relation to sex, type of board and courses of studies. Science and Arts teachers had more environmental awareness in comparison to Commerce teachers. CBSE teachers had more environmental awareness in comparison to UP Board teachers because of the rich educational climate and method of teaching of CBSE schools with compare to the UP board schools. The female teachers had more environmental awareness in comparison to male teachers.

2.3 OBSERVATIONS OF RESEARCHES RELATED TO ENVIRONMENTAL AWARENESS


2.4 STUDIES RELATED TO ATTITUDE TOWARDS ENVIRONMENTAL POLLUTION

Shahnawaj (1990) conducted a study to explore the issues related to the awareness and attitudes of teachers and students towards the environment. It was found that 95% teachers and 94% students possessed positive environmental attitudes. Teachers had more
awareness of the environment than students. Girls possessed significantly more awareness of the environment and positive environmental attitude than boys.

Pathak, Aditi & Vohra Swasti Shrimal (1996) conducted a study to assess the awareness level, attitudes and behavioural commitments regarding the ecological issue of pollution. Findings revealed significant sex differences in the effect, verbal commitment and knowledge sub scales however, sex difference was not significant for the actual commitment sub scale. The actual commitment and knowledge subscale were found to be negatively related, the highest level of awareness was regarding the issue of pollution caused by motor vehicles and the energy commission. All the students had a very favourable attitude towards all the ecological issues of pollution. The highest level of behavioral commitment was found towards the issue of public reliability insurance while it was least regarding the issues of no smoking in the public cases. Sex differences were also observed on four ecological issues in favour of girls.

Kotia, B.C. Shyam, Radhey, Sharma O.P. & Sharma (1999) investigated the relationships between knowledge about environmental issues, fear appeals attitudes and behaviour. The result revealed a significant positive relationship between far appeals and attitudes. Attitudes and behaviour were significant and positively related. A weak negative relationship between knowledge about environmental issues and behaviour was obtained. Implication of the result in terms of environmental awareness and conservation behaviour has been discussed.

Francis, S. (2001) conducted a study to investigate into attitude of students and teacher towards environmental hazard to education. It was found that attitude of those who belonged to a particular area, having similar culture had displayed more or less similar attitude formation and changed towards environmental hazards affecting education.

Barraza and Welford (2002) conducted a study on environmental attitudes and found that school with strong orientation in environmental studies seemed to transmit environmental information more effectively than school with no environmental policies and schools played very important role in the formation and promotion of positive attitudes towards environment and environmental awareness in young school population.

Dietz et al. (2002) conducted study on environmental attitude and found that there was no substantial differences in value factor structure but differences in value priorities with
women ranking altruism are more important than men. This analysis supported work that focused on mean differences in environmentalism in relation to gender in favour of women. Difference existed on the factor of altruism because of the high score of environmentalism of women. 

Drori and Yutchman –(2002) conducted a study to investigate hazards and attitudes environmental vulnerability. They found that urban public in general was responsible to the environmental vulnerability of its community. 

De Lavega,E.L. and Holt L.(2004) conducted research on awareness, knowledge, and attitude about environmental education: responses from environmental specialists, high school instructors, students, and parents. This study found statistically significant differences among the groups regarding the levels of awareness, knowledge, and attitude (AKA) as related to environmental issues. The environmental specialists scored highest for all AKA components as compared to the lowest levels presented by parent awareness, parent attitude, and high school student knowledge. In addition, factors such as socioeconomic status, ethnicity, and preference of leisure activities resulted in differences among the groups regarding their levels of environmental AKA. This study supports the evaluation of AKA levels among participants as an appropriate approach to the evaluation of environmental curriculum objectives. In addition, the study suggests a simplified measurement of AKA as an attempt to unify the parameters measured by numerous instruments found throughout environmental education literature. 

Arjunan,N.K. and Abraham Mercy(2005) conducted a study on Environmental Attitude of secondary school students in relation to their environmental interest. The results showed that the secondary school students did not have a high level of environmental interest. A differential effect of gender and locale were observed in their environmental interest. Type of School does not affect Environmental Attitude .The boys and urban subjects were found to have more interest in environmental matters compared to their rural counterparts. 

Rout, S. K. and Aggarwal,S.(2006) conducted research on environmental awareness and environmental attitude of students at high school level. It was found that the students of science stream have more environmental awareness and environmental attitude than the
students of non science stream. The male and female students do not differ significantly in terms of their environmental awareness and environmental attitude.

Shiva Kumar K. and Mangala S. Patil (2007) conducted research on influence of environmental education on environmental attitude of postgraduate students. Environmental education course influences the attitude level of the students towards environmental pollution and related issues. There is no significant difference between male and female students in their attitude towards environmental pollution and related issues.

AlRabaani, A.B.H. and AlMekhlafi, S.S.M. (2009) conducted study on attitudes of Sultan Qaboos University students towards some Environmental Problems and their willingness to take action to reduce them. The results showed generally that the students hold positive attitudes towards the issues raised and that female students showed more positive attitudes than males. The results indicated that students’ attitudes towards environmental problems did not appear to be influenced by the university faculties in which they are studying, except in the case of energy, where significant differences were observed between the attitudes of students from the faculty of Education and the faculty of Agriculture, the former showing more positive attitudes than the latter. The results showed that students were willing to take action to reduce environmental problems; this was not affected by gender or faculty.

Arora, L. and Agarwal, S. (2011) conducted research on knowledge, attitude and practices regarding Waste Management in Selected Hostel Students of University of Rajasthan, Jaipur. It was found that knowledge, attitude and practices of University students regarding waste management was low, less favorable and moderate respectively and correlation between knowledge and attitude, attitude and practices was found to be insignificant, but significant correlation was found between knowledge and practices. Factors influencing knowledge of the respondents, factors influencing included in this part of the study were level of education and stream of education. There was a significant difference in the knowledge regarding waste management based on educational levels of the respondents. It means that PG students have higher scores of knowledge as compared to UG students. A significant difference was also observed between Sc and Non Sc
students which signify that stream of education makes an impact on knowledge regarding waste management in favour of Sc students.

Eilam, E. and Tamar, T. (2012) conducted study on environmental attitudes and environmental behavior - which is the horse and which is the cart? The results suggest that among adults, the strategies required for influencing attitudes are different from those required for influencing behaviors. The mechanisms for achieving influence among children are different from those among adults and conventional educational approaches, such as behavior modification, can influence behavior more easily than they can influence attitudes.

Yousuf, A. and Bhutta, S. (2012) conducted research on secondary school students’ attitude towards environmental issues in Karachi Pakistan. The results of the study indicate that there were significant difference between government and private schooling systems students’ attitudes. Private schools students reported to have a significantly high degree of positive attitude towards environmental issues as compared to their government counterparts. The participants responses were distributed among the five options (i.e. strongly disagree, disagree, neutral, agree, strongly agree). The findings revealed that Pakistani students generally have moderately favourable attitudes towards environmental issues. The students scored highest in item 7 which is about the vision for future. It is worth mentioning that the students scored (M = 4.26). Students’ images of the future affect actions in the present, they try to adapt what they imagine and acts that they wish for future. Future images are influenced by the background, experiences, knowledge. Showing positive attitude regarding finding solutions to environmental problems suggest that students seem more concerned about the environmental problems. Overall results reveal that in general students have moderately favourable attitude towards environmental issues. They seem to be eager to find the solutions to environmental problems and show optimistic trends about the future. The results of the study give us the overall impression of moderate attitude of students towards environmental issues.

Khan, S.H. (2013) conducted a study of attitude towards Environmental Awareness in relation to certain variables among senior secondary school students. There is no significant difference between the mean scores of the boys and girls studying in twelth standard on the attitude towards environmental awareness. There is significant difference
in the attitude towards environmental awareness of the students studying in private and government senior secondary schools of the same city. There is no significant difference on attitude towards environmental awareness of senior secondary school students with respect to residence.

Singh A. , Srivastava R. N.( 2013) conducted research on knowledge, attitude and practices of bio-medical waste management amongst staff of institutional trauma center. It was found that knowledge regarding handling and safe disposal biomedical waste management among 42.5% medical students was inadequate. Majority was deficient in knowledge and awareness regarding categories of bio medical waste (73.2%) and its disposal in colour bags (71.3%). The results of questionnaire analysis show that about 85% and 81% amongst the consultant and resident respondents respectively, have relevant knowledge of BMW management. Out of these there were 12 consultants of medical departments and rest 16 were of surgical side. Though all the consultants were having the relevant knowledge but they were having varying attitude and practices. There was a significant difference amongst them, as far as attitude and practices of BMW were concerned. This shows that the people with higher education have more awareness about the environmental issues, national and international activities in Biomedical waste management and the rules prescribed there in, significantly the professional status and higher education were not having a direct positive impact on their attitudes towards the facts and thus their practices were also not corresponding. There was very significant high knowledge and attitude of BMW management amongst the nursing staff of the trauma center. There were significantly low practices of biowaste management. The nurses or Operation Theatre staff, were find to have a good percentage of knowledge, almost similar in all the three groups I and II and therefore, attitude and practice percentage is also very high. Sanitary staff though has very poor knowledge about the BMW Act and rules, but a good percentage of this category has a positive attitude and practice habits. The laboratory staff was found to have recorded lowest in all the three aspects.

Adejoke,O.C., Mji,A. and Mukhola,M.S.(2014) conducted research on students’ and teachers’ awareness of and attitude towards Environmental Pollution: A Multivariate Analysis Using Biographical Variables, it is important for students in their teenage years
to know and be aware of environmental matters because they will grow to be conscious and responsible adults who will take care of their environment. Among students, no gender effects were found however, significant effects with respect to age and Attitude, as well as grade level and Awareness were established. For teachers, on the other hand, no significant effects were established for all the biographical variables tested. Teachers had higher scores with respect to environmental Awareness and Attitude compared with their students. Differences between each of Awareness and Attitude against students’ gender revealed that these were not statistically significantly different. This was in spite of the fact that females had higher Awareness and Attitude mean scores than their male counterparts. There was no statistically significant difference between the teachers’ gender and Awareness. However, a statistically significant gender difference was established with Attitude. With respect to age the researchers found that older students revealed lower levels of attitude compared to their younger counterparts. In terms of grade level it was found that students in Grade 12 had more awareness than those in Grade 8. In terms of the effects of biographical factors on Awareness and Attitude, the study reveals no statistically significant differences with respect to the gender of the students. Statistically significant differences were however established with respect to age and the grade students were in. For teachers on the other hand, it was found that the males had positive Attitude compared to the females. However, in terms of the teachers’ age, teaching experience, and specialisation no statistically significant effects were established. Furthermore, it is reported that teachers’ scores were statistically significantly higher than those of their students.

2.4.1 OBSERVATIONS OF RESEARCHES RELATED TO ATTITUDE TOWARDS ENVIRONMENTAL POLLUTION

1. Attitude towards Environmental Pollution is highly favourable among female students as compared to male students. Shahnawaij (1990), Pathak (1996), Dietz (2002), Alrabaani (2009)


3. Attitude towards Environmental Pollution is independent of residential area Francis (2001), Khan (2013), and type of school Arjunan (2005).

As it is cleared from the above stated reviews that research has been done on computer assisted instruction, but the effect of computer assisted instructions on environmental education, environmental awareness and attitude towards environmental pollution need to be explored. The researcher found this area as a new field of research which prompted the researcher to take this problem for investigation.