SUMMARY

The education system of India is changing at a very fast pace and this change is occurring due to the introduction of technology in the field of education. The field of education is the earlier adopter of technological change which includes internet, power point presentations, use of smart boards, uses of laptops, slides and other uses of computer related technology. With the use of these computer assisted technologies, this field becomes more advanced and innovative. But the role of teachers is worth mentioning in this case because these are the teachers who prompted these changes in this field and it is due to their efforts and sacrifices that we are seen students learning through these innovative things.

This type of computer assisted learning clearly has its effect on the learning of the students and the students can learn at a much faster pace and level with their help. The use of these technological equipments not only has its effect on the academic achievement of the students but it also has its effect on the other aspects of the personality of the students like the students can become more self confident by learning through the use of technology and their interactive skills can also be improved. They can better interact with their classmates, with their teacher, with their parents and most importantly they can comprehend various concepts of their subjects in a better way than before. This makes the future of our country bright and confident.

Though education plays an important role in the development of the personality and the modification of the behaviour throughout our life, but adolescent is the age in which this type of change occurs at the maximum and the habits which are framed in this age group will become permanent for the whole life and this is also true in the case of education. If we make our education system technology oriented in this very phase of the life of our students, it will have a positive effect on their whole life. So, the education system should try to incorporate technology oriented education right from this age of the students, so that their whole personality and behaviour can be influenced and they can be made better citizens of the country.

Keeping this thing in mind, our educationists and academicians suggested the use of technology in the field of education as early as possible and it is due to their efforts that in most of the private schools and now in the government schools also, the use
of computers at an early age becomes a normal feature and all the students are learning through the use of technology oriented education system.

Now the question arises whether this use of technology will make the traditional system of education like the use of lecture method inappropriate? Will now only the technology oriented education works and the role of teachers has been replaced by the computers? Whether the students can only made to learn only through the use of technology? Whether the use of technology has a great impact on the academic achievement of the students and various other aspects of their personality like their self confidence and interactive skills? In order to answer all these questions in an empirical way, this study was taken in hand by the investigator in order to evaluate the effect of computer assisted learning on self confidence, interactive skills and achievement of adolescents in science.

Everett (1995), “Computer-assisted learning (CAL) is defined as the use of a computer and other associated technology with the intention of improving academic performance.”

Maran (1996), “CAL can be offered as a software package or it may be accessible via the World Wide Web. The Web is basically a part of the Internet that consists of millions of documents stored on computers around the world.”

Hossein (2002), “Computer-assisted learning is to convey a vast amount of information in a very short period of time. It is a powerful method of reinforcing concepts and topics first introduced to you through your textbook, and discussion in the classroom. Computer-assessed learning enables you in a powerful way to comprehend complex concepts.”

Agnihotri (1987) defined it as a composite of person's thoughts and feelings, fear and fantasies, his view of what he is, what he has been, what he might become and his attitudes pertaining to his worth.

Smith (1962) identified six dimensions of self, the first of them is self confidence. It is a positive attitude of oneself towards one's self concept.

Basavanna (1975) also identified self confidence as an aspect of self concept and thus he emphasized that it should not be confused with the self concept itself.

Lynn Brogan (2009) Interactive learning occurs when a student puts together knowledge and skills by connecting with information and experiences provided by the teacher. The student is engaged both intellectually and emotionally in interactive
learning. Feedback, reflection and dialogue are integral components of interactive learning.

Crow and Crow (1969)," Achievement means the extent to which a learner is profiting from instructions in a given area of learning."

Good (1973) refers to academic achievement as, "The knowledge attained or skill developed in school subjects usually designated by test scores or marks assigned by the teacher."

Pandey (1973)," Academic achievement is the quantity and quality of learning in a subject or group of subjects as assessed by examination marks."

Hawes and Hawes (1982)," The word academic means referring to the institutional system of formal education within a school, college or university, theoretical and not of practical importance, a scholarly person who works in higher education."

Teneja's Dictionary of Education (1989)," Academic achievement refers to performance in school or college in standardized series of educational test."

Ladson-Billing (1999) stated that at its best, academic achievement represents intellectual growth and the ability to participate in the production of knowledge. At its worst, academic achievement represents inculcation and mindless indoctrination of the young into the cannons and orthodoxy.

Chei-Chang Chiou (2015) compared the effect of different concept mapping on students' learning motivation and academic achievement. A pretest-posttest control group experimental design was employed. The participants were 151 students from the Department of Accounting Information at a private university in central Taiwan who were taking an advanced accounting course. An effect size and analysis of covariance were used to analyze experimental results. Experimental results showed that the two computer-assisted concept mapping techniques (construct-on-scaffold and construct-by-self) are more beneficial to students' learning motivation and academic achievement than traditional paper-and-pencil concept mapping and textbook exercise methods. In addition, traditional paper-and-pencil concept mapping is better than the textbook exercise method. However, no significant differences existed between the two computer-assisted concept mapping techniques.

Fafchamps M. and Di Mo (2015) conducted a large scale RCT to investigate peer effects in computer assisted learning (CAL). Identification of peer effects relies on
three levels of randomization. It is already known that CAL improves math test scores in Chinese rural schools. They found that paired treatment improved the beneficial effects of treatment for poor performers when they were paired with high performers. They test whether CAL treatment reduces the dispersion in math scores relative to controls, and we found statistically significant evidence that it did. They also demonstrate that the beneficial effects of CAL could potentially be strengthened, both in terms of average effect and in terms of reduced dispersion, if weak students were systematically paired with strong students during treatment. They first time identified that a school intervention programme had peer effects which unambiguously help weak students catch up with the rest of the class without imposing any learning cost on other students.

Jonita Mekie at el. (2015) concentrated on the special needs of mentally challenged learners. The study carried out focused on the survey of various specialized programs such as ‘Math Explorer’, Teach Town: Basics, Animated Pedagogical Agents, to name a few, that had been used for special needs learners for their social, emotional and cognitive skills. Also they reviewed the research work that uses Computer Assisted Technologies or other Learning Technologies carried out for the spectrum for special needs learner. In their study they carried out for preschool and K-1 students, va computer assisted instruction program TeachTown: Basics were implemented for three months. This program was carried out for 47 ASD children. The program also consists of supplementary off-computer activities. The program lasted for 3 months and each approximately the duration was 20 minutes per day on computer and 20 minutes per day off-computer.

The following observations were made by them may be done:

- Learning challenges can be met through audiovisual representation. Learning done in this manner makes learning simple, easy and has a lasting effect.
- Learning can be simplified and retention can be made high when variety is added to the format of learning content.
- Computer assisted technologies for learning technology are more effective in special education, although individualized programs have to be catered.
- A design of interactive and self-regulated learning environment promotes learning and motivates the learner for learning.
Since it is difficult to have individual program for every learner, an adaptive system designed especially for need based learners will assist the learner to fulfill his learning requirements.

**Birjandi P. and Pahlavani P. (2014)** investigated the effectiveness of computer-aided argument mapping (CAAM) on the improvement of writing achievement of Iranian learners of English. To this end, after administrating a language proficiency test and an essay writing test, 90 students were chosen as the participants of this study. Next, the participants were categorized randomly into three groups as control, experimental 1, and experimental 2. During the course, as the both experimental groups did their writing tasks with the CAAM software (in person/in pairs), the control group did their assignments with pen and paper. Finally, a post test of essay writing was administered for all participants. Using SPSS version 19 and One-way ANOVA statistical procedure, the results showed a statistically significant difference between those who received the technique of CAAM and those who wrote their assignments in traditional way. Also, there was a statistically significant difference between the participants in the both experimental groups. In other words, collaborative learning in a computer hands-on learning environment was effective on writing achievement.

**Isiaka A.G. et al (2014)** examined the effects of two modes of computer-assisted instructional package on solid geometry achievement amongst senior secondary school students in Minna, Niger State, Nigeria. Also, the influence of gender on the performance of students exposed to CAI(AT) and CAI(AN) packages were examined. This study adopted a pretest-posttest experimental design with 3 x 2 factorial design and a sample of 120 Senior Secondary class Two (SSII) students (60 male and 60 female). Computer-Assisted Instructional package of two modes; Animation with Text (AT), and Animation with Narration (AN) were employed as treatment instruments and a Solid Geometry Achievement Test (SGAT) was used as test instrument. A trial test was carried out and a reliability co-efficient of 0.78 was obtained using the KR-21. Analysis of Variance (ANOVA) and t-test was used in analyzing data collected. The study revealed that, there were significant differences in the post-test mean scores of CAI(AT), CAI(AN) and the control group (F = 11.468, df = 119, p<0.05) and the Scheffe’s post-hoc test revealed a significant difference between CAI(AN) and the lecture method groups, favoring CAI(AN), there was no statistically significant difference in the post-test mean scores of male and female
students taught using CAI(AT) \( (t=0.660, df=38, p>0.05) \) and CAI(AN) \( (t=1.455, df=38, p>0.05) \). Based on these findings, it was therefore recommended that mathematics teachers should be encouraged to use CAI(AN) for meaningful and effective teaching and learning of mathematics.

**Ladan M. et al (2014)** carried out this study with the aim of investigating the effect of Computer-Assisted Instruction (CAI) on, creativity and academic performance of the students at the sixth grade elementary schools in Kerman. For this reason of 1761 boy students at 6th grade elementary schools in Kerman by cluster sampling method one primary school has been selected. Then randomly two classes of this school were chosen. 31 students who were selected by random sampling was divided into two groups 15 of them in traditional education and training and the others students in Computer-Assisted Instruction (CAI) group. At first a pretest by using the Torrance creativity questionnaire (1986) and cognition O'Neal and Abedi (1996) questionnaire after two months of traditional and Computer-Assisted training and education\[6\], post-test were examined. The scores of math exam were used for academic performance. The data was analyzed by using SPSS19. Research findings obtained by using (t-independent test) for measuring academic performance between two groups and Covariance analyzing method for measuring the effectiveness of the components of creativity and meta cognition showed that computer-assisted instruction in creativity and meta-cognition has a significant impact but on students’ academic performance, a significant difference could not be seen.

**Nguyen V.H. and Henriette V.R. (2014)** investigated the effect of Computer Assisted Language Learning (CALL) on performance in the Test of English for International Communication (TOEIC) listening module. Two groups of participants enrolled in the same major, had equivalent general English background and attended the TOEIC listening class twice a week with the same teacher – the researcher in 7 weeks at the College of Finance and Customs, in Vietnam. There were 25 students in the treatment group and the control group. The quasi-experimental method, questionnaire and post-test were used in this study. The material input was designed with the application of CALL introduced into the treatment group only whereas the control group still learned with the current textbook only. The results showed that there was difference in the performance on TOEIC listening test scores between two groups. The students in the treatment group used
listening strategies more effectively than the students in the control groups. Moreover, CALL instruction and teaching method increased the students' TOEIC listening scores significantly.

Yi-Horning Lai (2014) conducted this study to synthesize existing research comparing the effects of CAI versus (traditional instruction) TI on students’ achievement in Taiwan. In spite of claims regarding the potential benefits of using CAI in education, research results comparing the effects of CAI and traditional instruction in Taiwan are conflicting. Some studies all reported significant gains for CAI over traditional instruction. However, some studies had found no significant differences between CAI and traditional instruction. In an effort to lend data to this debate, this study provides the first meta-analysis of CAI verse traditional instruction in Taiwanese schools. The results from this study suggest that the effects of CAI in instruction are positive over traditional teaching in Taiwan. Students’ learning achievement in language subject area was significant different from mathematics subject area, but learning achievement in sociology, science, and computer subject area were insignificant different from mathematics subject area. Students’ learning achievement with multimedia type CAI was significant different from with web-based type CAI, and students’ learning achievement with web-based type CAI was better than with multimedia type CAI.

Alhassan D.S. et al. (2013) determined the effectiveness of Computer-Assisted Instructional package (CAIP) on achievement and retention in geometry among junior secondary schools in Minna Metropolis. Two research questions were raised and two null hypotheses were tested. The study adopted the pre-test-posttest - control group design. Simple random sample of eighty students were drawn from four junior secondary schools in Minna Metropolis. The researcher developed computer assisted instructional package on geometry which was used as treatment instrument for experimental group while control group were exposed to traditional teaching method. The instrument for data collection was Geometry Achievement Test. A 40-items multiple-choice objective type achievement test covering ten selected topics in Geometry was used. A reliability coefficient of 0.75 was obtained using Pearson’s product moment correlation coefficient(r).The t-test statistics was used to analyze the hypothesis. The findings revealed that experimental group performed better than the control group. It was recommended that government
should organized seminars, workshops and symposium for teachers on the development of computer assisted instructional package to enhance learning among students.

**Arslanyilmaz, A. (2013)** described a prototype for a computer-assisted task-based language instruction (CATBI) tool designed and developed for Turkish as a Foreign Language, and to report on the effectiveness of the CATBI tool. More specifically, this work discusses an experimental study that examined the role of teaching approach in foreign language development by comparing CATBI to computer-assisted form-focused language instruction (CAFFI) on language production in terms of accuracy, lexical complexity, and fluency. For a duration of 7 days, two intermediate-level Turkish as a Foreign Language classes consisting of 28 high school students participated in this experiment. The classes were randomly assigned to two treatment groups: an experimental group with CATBI and a control group with CAFFI. Statistical analyses revealed that students in the CATBI group produced significantly better and more fluent language than students with CAFFI. However, no significant effects were found in terms of accuracy and lexical complexity of the language produced. Based on these results, it was concluded that CATBI is more effective than CAFFI in enhancing language production in general and fluency in particular.

**Manca, S. and Ranieri, M. (2013)** attempted to provide a critical overview of current studies focusing on the use of Facebook as a technology-enhanced learning environment, with the aim of exploring the extent to which its pedagogical potential is actually translated into practice. Only empirical studies published in peer-reviewed academic journals with a specific focus on Facebook as a learning environment had been considered for the review. The authors conducted a comprehensive literature search that identified 23 relevant articles that were subsequently analysed according to a simplified list of guidelines. These articles were further analysed and recoded through a set of emerging categories. The results showed that pedagogical affordances of Facebook had only been partially implemented and that there were still many obstacles that might prevent a full adoption of Facebook as a learning environment such as implicit institutional, teacher and student pedagogies, and cultural issues.
Meihami H., et al (2013) described a study exploring the effect of Computer-Assisted Language Learning (CALL) on listening skill of Iranian EFL learners. A total of 74 Iranian Advanced students of English all male and with the age range of 20 to 22 participated in this study. They were divided into one experimental group (N = 37) and one control group (N = 37). While in the experimental group CALL was the dominate instrument in teaching listening skill, in the control group there was no use of CALL material. The findings of this study reveal that CALL materials have significant effect on improving Iranian Advanced EFL learners listening.

Nisha, V and Kumar, K. B. (2013) examined the effectiveness of CACT when employed as an adjunct with EBRT in the management of children with Reading, Spelling and Arithmetic disorder. 10 children between the ages 8 and 15 years meeting at least one of the ICD-10 criteria for Reading, Spelling and Arithmetic disorder were sequentially assigned to either EBRT + CACT, or only EBRT. The training for both the groups was conducted in 8-12 sessions, spread over 2 months. Pre- and Post-assessment was conducted using NIMHANS SLD index. It was found that the adjunct intervention relative to EBRT was superior in augmenting various academic skills. However, these differences did not reach statistically significant level owing to smaller sample size. The use of CACT along with EBRT resulted in significant improvement in spelling ability of the group undergoing the same. The CACT seems to have therapeutic potential in developmental disorders when combined with EBRT.

Županec V., et al. (2013) analyzed the comparative effectiveness of Computer-Assisted Learning (CAL) and the traditional teaching method in biology on primary school pupils. A stratified random sample consisted of 214 pupils from two primary schools in Novi Sad. The pupils in the experimental group learned the biology content (Chordate) using CAL, whereas the pupils in the control group learned the same content using traditional teaching. The research design was the pretest-posttest equivalent groups design. All instruments (the pretest, the posttest and the retest) contained the questions belonging to three different cognitive domains: knowing, applying, and reasoning. Arithmetic mean, standard deviation, and standard error were analyzed using the software package SPSS 14.0, and t-test was used in order to establish the difference between the same statistical indicators. The analysis of results of the posttest and the retest showed that the pupils from the CAL
group achieved significantly higher quantity and quality of knowledge in all three cognitive domains than the pupils from the traditional group. 

Adeyemi (2012) 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. Simple random sampling was employed in selecting 160 students from four co-educational public secondary schools in Osogbo and Ife Central Local Government Areas of Osun State, Nigeria. The study used a 2 x 2 factorial analysis of ANOVA and three null hypotheses were tested. Four instruments were used namely: “Social Studies Achievement Test” (SSAT) “Computer Assisted Instruction Guide for Social Studies” (AIGSS), “Teacher Operational Guide for Social Studies Instruction” (TOGSSI) and “Students’ Academic Ability Test” (SAAT) with reliability coefficients of 0.87, 0.79, 0.71 and 0.78 respectively. Data Analysis was done by using Analysis of Covariance Procedure. 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.

Awadh A.Y. Al-Qahtani, S.E. Higgins (2012) investigated the effect of e-learning, blended learning and classroom learning on students’ achievement. Two experimental groups together with a control group from Umm Al-Qura University in Saudi Arabia were identified randomly. To assess students’ achievement in the different groups, pre and post-achievement tests were used. For that all the students were taught with three methods namely blended learning in which total size of the sample was 55, e-learning in which the total size of the sample was 43 and the traditional learning in which the total size of the sample was 50. So, a total 148 students were taken as a sample for this study. The results of the study show that there was a statistically significant difference between the three methods in terms of students’ achievement favouring the blended learning method with a substantial effect size of 1.34 (Hedges’ g). No significant difference was found between the e-
learning and traditional learning groups in terms of students’ achievement and with a negligible effect size of 0.02.

Baytiran and Kesan (2012) investigated the impact of computer-assisted instruction method on students’ achievement and attitudes towards mathematics in secondary mathematics education. The research designed was based on an experimental pre-test post-test model. The research was conducted in 60 ninth grade students from a anatolian high-school during 2009-2010 academic year. The experiment group consists of 30 students and the control group consists of 30 students. The research is implemented by using computer-assisted teaching material that is developed by Flash MX program related with the unit of “Relation, Function and Operation” of the area of learning algebra and took 10 weeks. Computer–assisted instruction and traditional instruction methods were used in the experiment group and the control group respectively. The data were collected by using the Mathematics Test, Mathematics Attitudes Scale. Results demonstrated that teaching mathematics with a computer assisted instruction method increased student success significantly in mathematics lesson. However, the experimental and control groups did not differ between students’ attitudes towards mathematics.

De Koster, S., Kuiper, E. and Volman, M. (2012) Used a descriptive multiple-case study design, characterize the types of information and communication technology (ICT) use resulting from a ‘concept-guided’ approach in five schools. Teachers at schools characterized as having a ‘traditional’ or an ‘innovative’ school concept were supported in designing and implementing ICT-enhanced learning arrangements that fit their schools' educational concept. In the traditional schools, ICT was primarily applied to extend and support the use of standard teaching materials in mostly teacher-directed activities. The innovative schools on the other hand used ICT tools primarily to support open-ended activities with a lot of input from the pupils. All five schools expected ICT to increase pupils' motivation, improve learning results, promote self-directed learning, and enable differentiation between pupils. Yet underneath these goals, they find distinct differences in expectations between the two school types.

Koorosh, Soori and Kafipour (2012) investigated the effect of Computer Assisted Language Learning (CALL) on English Foreign Language (EFL) students’ writing achievement. Forty students in a high school in Iran were selected and divided into
experimental and control groups (20 and 20 respectively). An independent sample t-test was run to find if there were any significant differences between the results of the experimental and control groups in the writing test. CALL users’ achievement in EFL were significantly higher than nonusers (df = 38, p≤.05). This significant difference between the two groups favoring CALL users was an indication of the effect of CALL on improving students’ knowledge and competency in EFL.

Simon, S., Johnson, S., Cavell, S. and Parsons, T. (2012) reported on the outcomes of a study that utilized a graphical tool, Digalo, to stimulate argumentative interactions in both school and informal learning settings. Digalo was developed in a European study to explore argumentation in a range of learning environments. The focus here was on the potential for using Digalo in promoting argumentative interactions of students in primary science, first, in a school-based context of students investigating and learning about electricity, and second, in a hands-on science discovery centre where students are interacting with different scientific phenomena. Data sources included observations of students using Digalo in the two contexts and the resultant Digalo maps. Analysis of observations focused on students’ engagement and interactions, and of Digalo maps in terms of the process and content of argumentation. A previously developed level system was used to evaluate the process of argumentation. The study had revealed some limitations of Digalo as a teaching resource, but had provided insights into ways in which students build their knowledge with the help of Digalo as they interact with each other and with scientific phenomena.

Steven Higgins et al. (2012) summarized the research evidence contained in meta-analyses to identify patterns of impact in the accumulating research about the effects of technology on learning, and to identify the extent of the possible impact of technology on learning. A systematic search revealed 48 studies which synthesized primary research studies of the impact of technology on the attainment of school age learners (5-18 year olds). Overall, the research evidence over the last forty years about the impact of digital technologies on learning consistently identifies positive benefits. The increasing variety of digital technologies and the diversity of contexts and settings in which the research has been conducted, combined with the challenges in synthesising evidence from different methodologies, makes it difficult to identify clear and specific implications for educational practice in schools. Studies
linking the provision and use of technology with attainment tend to find consistent but small positive associations with educational outcomes. However a causal link cannot be inferred from this kind of research. It seems probable that more effective schools and teachers are more likely to use digital technologies more effectively than other schools. We need to know more about where and how it is used to greatest effect, then investigate to see if this information can be used to help improve learning in other contexts. We do not know if it is the use of technology that is making the difference. Research findings from experimental and quasi-experimental designs – which have been combined in meta-analyses – indicate that technology-based interventions tend to produce just slightly lower levels of improvement when compared with other researched interventions and approaches (such as peer tutoring or those which provide effect feedback to learners). The range of impact identified in these studies suggests that it is not whether technology is used (or not) which makes the difference, but how well the technology is used to support teaching and learning. There is no doubt that technology engages and motivates young people. However this benefit is only an advantage for learning if the activity is effectively aligned with what is to be learned. It is therefore the pedagogy of the application of technology in the classroom which is important: the how rather than the what. This is the crucial lesson emerging from the research. Taken together, the correlational and experimental evidence does not offer a convincing case for the general impact of digital technology on learning outcomes. This is not to say that it is not worth investing in using technology to improve learning. But it should encourage us to be cautious in the face of technological solutions to educational challenges. Careful thought is needed to use technology to best effect. There is a recurrent and specific challenge in understanding and applying research evidence as it takes time for robust evidence to emerge in education, and the rapid pace of change of technology makes this difficult to achieve.

**Sujit, P. et al (2012)** identified the influence of Interactive Multimedia Courseware on the achievement in Physical Science of Class-VIII Students. A computer assisted multimedia courseware was developed with the help of Adobe Flash and Bangla Word on a single unit of Physical Science Curriculum of class-VIII under WBBSE (Bengali medium). Two equivalent groups of class-VIII students (experimental and control) were selected. One group was exposed to the multimedia courseware while
the others are not. The performance of the both groups was then compared statistically (using t-test and ANOVA) after administering the self prepared standardized achievement test. The observed t value was higher than the critical value at 1% level of significance. ANOVA test also provide significant difference between experimental and control group. So statistically it can be concluded that computer assisted multimedia courseware facilitates students learning in Physical Science better than the traditional chalk and talk method.

Yu-Hsin Cheng et al (2012) investigated the effect of multimedia computer assisted instruction on student learning achievement using the high school curriculum entitled “molecules that dominate secret of life” from high school biology. There were 108 students from five classes selected throughout the high school and the total effective sample size was 95 people after removing 13 students with absence during the experimental period and invalid questionnaires. The study classified the students into 8 groups with codes from A to H according to two indicators: learning style (Diverger, Assimilator, Converger, or Accommodator) and teaching model (multimedia computer assisted instruction model or traditional teaching model). The effect of different instruction models on learning achievement using ANCOVA to determine whether there is a significant difference of learning achievement between testing with a multimedia computer assisted instruction model or a traditional teaching model. The independent variable of the test was the different instruction model while learning achievement was the dependent variable. This study examined the effect of different instruction models and learning styles on learning achievement using MANCOVA to identify the significant difference of learning achievement within grouped students. The independent variable of this test was the different instruction model and learning styles while the dependent variable was the learning achievement. The results show that when compared to traditional models of instruction, students using the multimedia computer assisted instruction model scored significantly better in learning achievement assessments. Secondly, the study also discussed the combined effect of instruction model and learning style on student learning achievement. The results show that students exposed to a converging learning style with traditional instruction perform significantly better than those exposed to three other learning styles. Nonetheless, students exposed to these same three other learning styles performed better when exposed to the multimedia
computer assisted instruction model. As a result, under the influence of multimedia instruction, students exposed to the four learning styles (Diverger, Assimilator, Converger, and Accommodator) do not shown any significant difference.

6.1 STATEMENT OF THE PROBLEM
Before the implementation of information technology in the field of education, the teacher is regarded as the boss of the entire process of teaching and learning and everything goes according to his will, experience and knowledge. The student can only learn what their teacher knows about that very subject and that very topic. So, the knowledge of the students' remains delimited to the knowledge of their teacher. But with the implementation of information technology, the field of education particularly teaching and learning has no boundaries. Now, the students are not confined to the knowledge of their teachers, but they can go much beyond of that. They can learn from the use of technology with the use of computers, internet and other technological equipments. In this way, they can supplement the knowledge they gained from their teacher and thus can widen their mental horizon. It also helps in increasing their self confidence, interactive skills and achievement in various subjects. So, the problem under investigation is entitled as "EFFECT OF COMPUTER ASSISTED LEARNING ON SELF CONFIDENCE INTERACTIVE SKILLS AND ACHIEVEMENT OF ADOLESCENTS."

6.2 OBJECTIVES OF THE STUDY
Various research works covered in the literature survey give different opinions and conclusions and could not be generalized across all the conditions. Taking that into consideration, the present study was taken in view keeping in mind the following objectives:-

1. To study the effect of CAL on
   i) Self confidence
   ii) Interactive skills
   iii) Achievement in science of adolescents

2. To study the effect of CAL on Self confidence of adolescents with respect to
   i) Gender
   ii) Locality
   iii) School type
3. To study the effect of CAL on Interactive skills of adolescents with respect to
   i) Gender
   ii) Locality
   iii) School type
4. To study the effect of CAL on Achievement in science of adolescents with respect to
   i) Gender
   ii) Locality
   iii) School type

6.3 HYPOTHESES OF THE STUDY
Taking into consideration the above objectives, the present study was taken in view keeping in mind the following hypotheses:

1. There is no significant effect of CAL on
   i) Self confidence
   ii) Interactive skills
   iii) Achievement in science of adolescents.

2. There is no significant effect of CAL on Self confidence of adolescents’ with respect to
   i) Gender
   ii) Locality
   iii) School type

3. There is no significant effect of CAL on Interactive skills of adolescents’ with respect to
   i) Gender
   ii) Locality
   iii) School type

4. There is no significant effect of CAL on Achievement in science of adolescents’ with respect to
   i) Gender
   ii) Locality
   iii) School type

6.4 DELIMITATIONS OF THE STUDY
   i. It was delimitied to adolescent students who studied in 10th grade.

307
ii. It was delimited to adolescent students of Fazilka district only.
iii. It was delimited to self confidence, interactive skills and achievement of adolescents' variables only.
iv. Achievement of adolescents means their achievement in the subject of Science.
v. It was delimited to gender, locality and school type like demographic variables only.

6.5 SAMPLE DESIGN

For collection of data, the investigators first of all choose favourable sampling technique. In the present study, the experimenter had adopted stratified randomization technique. The sample consisted of 120 students of 10th class of various schools of Fazilka District. The sample was taken from four schools of Fazilka district namely Holy Heart Day Boarding Public School, Fazilka, Lala Saran Dass Buta Ram Aggarwal Sarv Hitkari Senior Secondary Vidya Mandir, Fazilka, Government Senior Secondary School, Khuikhera and Shaheed Balwinder Singh Government Senior Secondary School, Sabuana. Out of these schools, two schools were chosen from urban area and two schools were chosen from rural area. Also from these schools, two schools were government owned and two were privately runned. From every school students of 10th class were taken as far the requirement of the research project. Then they were divided into two groups on the basis of the intelligence test namely Samoohik Mansik Yogita Pariksha (R.K.Tondon, 1973) i.e. experimental and controlled group by using balancing group technique. The total size of the sample was 120.

6.6 TOOL USED

Following tools were employed to collect the data for the present study:-
2. Pandey Self-Confidence Inventory.
3. Interactive Skills Scale for the students of 10th Grade standardized and Validated by the Investigator herself.
4. Achievement Test in Science for the students of 10th Grade standardized and Validated by the Investigator herself.
5. CAL package of Science for the Students of Xth Grade.
6.7 DATA COLLECTION
First of all the investigator got acquainted with the tools, their purpose, administration and procedure of scoring. Then the investigator approached the heads of various educational institutions selected for the above research work for their cooperation, for the collection of data with a request for time and date. They were taken into confidence and told about the purpose behind the study and collection of data. After seeking their permission for the collection of data on their students of 10th grade on self confidence, interactive skills and the subject of science, the students were also be taken into confidence and were given a test of intelligence namely Samoohik Mansik Yogita Pariksha and on the basis of this test scores, they were classified into two groups namely controlled group and experimental group. Both these groups were given a pre-test on self confidence, interactive skills and Science Achievement Test and their scores on this pre-test were recorded. After giving experimental treatment to the experimental group while keeping the controlled group as constant, a post test was given to both the groups and thus the data collection process was completed. After administration of the test, scoring was done separately for all the three questionnaires.

6.8 TECHNIQUES FOR STATISTICAL ANALYSIS
Weighted Average Score, Arithmetic Mean, Standard Deviation, Coefficient of Variation, Percentage, Range, Skewness, kurtosis, Coefficient of Correlation, t-Value, F-Value were used for the analysis of data for the present study.

6.9 CONCLUSIONS
In the present study, the researcher wanted to study the effect of computer assisted learning on self confidence, interactive skills and achievement of adolescents. Hypotheses wise findings are as follows:-
1. There is significant effect of CAL on self confidence of adolescents. Thus Hypothesis-1(a) "There is no significant effect of CAL on self confidence of adolescents" stands rejected.
2. There is significant effect of CAL on interactive skills of adolescents. Thus Hypothesis-1(b) "There is no significant effect of CAL on interactive skills of adolescents" stands rejected.
3. There is significant effect of CAL on achievement of adolescents in science. Thus Hypothesis-1(c) "There is no significant effect of CAL on achievement of adolescents in science" stands rejected.

4. There is significant effect of CAL on self confidence of male adolescents. Thus Hypothesis-2 (i) (a) "There is no significant effect of CAL on self confidence of male adolescents" stands rejected.

5. There is significant effect of CAL on self confidence of female adolescents. Thus Hypothesis-2 (i) (b) "There is no significant effect of CAL on self confidence of female adolescents" stands rejected.

6. There is significant effect of CAL on self confidence of urban adolescents. Thus Hypothesis-2 (ii) (a) "There is no significant effect of CAL on self confidence of urban adolescents" stands rejected.

7. There is significant effect of CAL on self confidence of rural adolescents. Thus Hypothesis-2 (ii) (b) "There is no significant effect of CAL on self confidence of rural adolescents" stands rejected.

8. There is significant effect of CAL on self confidence of government school adolescents. Thus Hypothesis-2 (iii) (a) "There is no significant effect of CAL on self confidence of government school adolescents" stands rejected.

9. There is significant effect of CAL on self confidence of private school adolescents. Thus Hypothesis-2 (iii) (b) "There is no significant effect of CAL on self confidence of private school adolescents" stands rejected.

10. There is significant effect of CAL on interactive skills of male adolescents. Thus Hypothesis-3 (i) (a) "There is no significant effect of CAL on interactive skills of male adolescents" stands rejected.

11. There is significant effect of CAL on interactive skills of female adolescents. Thus Hypothesis-3 (i) (b) "There is no significant effect of CAL on interactive skills of female adolescents" stands rejected.

12. There is significant effect of CAL on interactive skills of urban adolescents. Thus Hypothesis-3 (ii) (a) "There is no significant effect of CAL on interactive skills of urban adolescents" stands rejected.

13. There is significant effect of CAL on interactive skills of rural adolescents. Thus Hypothesis-3 (ii) (b) "There is no significant effect of CAL on interactive skills of rural adolescents" stands rejected.

310
14. There is significant effect of CAL on interactive skills of government school adolescents. Thus Hypothesis-3 (iii) (a) “There is no significant effect of CAL on interactive skills of government school adolescents” stands rejected.

15. There is significant effect of CAL on interactive skills of private school adolescents. Thus Hypothesis-3 (iii) (b) “There is no significant effect of CAL on interactive skills of private school adolescents” stands rejected.

16. There is significant effect of CAL on achievement of male adolescents in the subject of science. Thus Hypothesis-4 (i) (a) “There is no significant effect of CAL on the achievement of male adolescents in the subject of science” stands rejected.

17. There is significant effect of CAL on achievement of female adolescents in the subject of science. Thus Hypothesis-4 (i) (b) “There is no significant effect of CAL on the achievement of female adolescents in the subject of science” stands rejected.

18. There is significant effect of CAL on achievement of urban adolescents in the subject of science. Thus Hypothesis-4 (ii) (a) “There is no significant effect of CAL on the achievement of urban adolescents in the subject of science” stands rejected.

19. There is significant effect of CAL on achievement of rural adolescents in the subject of science. Thus Hypothesis-4 (ii) (b) “There is no significant effect of CAL on the achievement of rural adolescents in the subject of science” stands rejected.

20. There is significant effect of CAL on achievement of government school adolescents in the subject of science. Thus Hypothesis-4 (iii) (a) “There is no significant effect of CAL on the achievement of government school adolescents in the subject of science” stands rejected.

21. There is significant effect of CAL on achievement of private school adolescents in the subject of science. Thus Hypothesis-4 (iii) (b) “There is no significant effect of CAL on the achievement of private school adolescents in the subject of science” stands rejected.

6.10 EDUCATIONAL IMPLICATIONS

1. The result of this study can be used to know the effect of computer assisted learning on the level of self confidence, interactive skills and achievement of
students studying in 10th grade and on the basis of the results of this study several types of changes and modifications can be introduced in Indian Education System.

2. The result of the present study help us to find out how far the computer assisted learning is effective in bringing about the desired changes in self confidence, interactive skills and achievement of adolescents studying in 10th grade and on this basis its implementation at various levels of education can be determined.

3. The result of the present study helps us to find out the role of various demographic variables in determining the effect of computer assisted learning on self confidence, interactive skills and achievement of adolescents studying in 10th grade.

4. The present study will be of greatest importance for the teachers and parents to whom the adolescents are continuously in concern. The teachers and parents can understand the various educational needs and problems of adolescents studying in 10th grade and can enhance the level of their self confidence, interactive skills and achievement.

5. The present study will be of greatest importance for the adolescent students themselves because they can understand their problems themselves in the traditional method of learning and take the help of teachers and parents to solve these with the use of computer assisted learning technologies and to develop their personality to the maximum possible extent.

6.11 FUTURE AREAS OF COMPREHENSIVE RESEARCH

On the basis of this empirical study, the researcher visualized the following areas of further comprehensive research:

- Effect of Computer assisted learning on some other variables of the personality of the students like their problem solving ability, their achievement motivation, creativity and stress management can be found out.
- A large sample of students may be surveyed to have deep perceptive of the effect of computer assisted learning.
- Effect of computer assisted learning on the various aspects of personality of students of higher and lower classes can also be evaluated.
- Effect of computer assisted learning on various subjects can be separately evaluated.