Chapter 2

Review of Related Literature

2.0.0 Introduction

First chapter deals with the conceptual framework of the present research preliminary and primary matters regarding the research. But, for any research to occupy the place in the development of a discipline, the researcher must thoroughly be familiar with both previous theory and research. The review of the related literature provides some insight regarding strong points and limitation of the previous studies. 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 phase ‘review of literature’ consists of two words: review and literature. The term ‘review’ means to organize the knowledge of the specific area of research to evolve an edifice of knowledge to show that the proposed study would be an addition to this field. In research methodology the term ‘literature’ refers to the knowledge of a particular area of investigation of any discipline, which includes its theoretical, practical and research studies. The task of review of literature is highly creative and tedious because the researcher has to synthesis the available knowledge of the field in a unique way to provide the rationale for his/her study. The review of the literature provide us with an opportunity of gaining insight into the methods, measures, subjects and approaches employed by other research workers. This in turn will lead to significant improvement of our research design. A literature review is usually a critique of the status of knowledge on a carefully defined educational topic. Literature of a review includes main types of sources: professional journal, reports, scholarly book and monographs, government documents and dissertation. It may include empirical research, theoretical discussion and review of the status of knowledge, philosophical papers.
A review of the literature serves several purposes in research. The review of related literature happens to be the most simple and fruitful method of formulating precisely the research problem or developing hypothesis.

The present chapter is an attempt to the review of literature related with the topic. The present chapter includes studies related to teaching-learning related variables such as computer assisted instructional materials, multimedia approaches, computer based teaching strategies, learning software, academic achievements, learning styles, learning skills, performance, learning levels and attitude of teachers and students towards teaching learning process. These studies are given below.

2.1.0 Studies conducted in India
2.1.1 Studies related to science teaching
2.1.2. Studies related to teaching of other subjects
2.2.0 Studies conducted abroad
2.2.1 Studies related to science teaching
2.2.2 Studies related to teaching of other subjects

2.1.0 Studies conducted in India

Review of the related literature conducted in India is broadly categorized into two categories. Initially review of the literature in science is done; then that general subject with technology regarding computer and instruction is made.

2.1.1 Studies related to Science Teaching

Many Indian researches have been conducted in the field of Computer Instruction Strategy, Cooperative Learning, Self-learning Method, Multimedia Instructional Strategy, Computer based Instruction Models, Concept mapping, Multimedia Programmes and Computer based Modules. Some are discussed below.

Banerjee, Anil Chandra (1998) studied on “Development of a Science-Technology Society (STS) Approach of Teaching Science in Middle Schools and Try-out of its Effectiveness in Selected Schools”. The objective of the study was to develop and field test science-technology society (STS) module test and STS approach of teaching science in middle schools. The finding shows that STS students can do equally well and significantly better in some classes in the concept domain in comparison to test book students.
Mohan kumar, A. and Rajaguru, S. (2001) have conducted a research study on “Multimedia Instructional Strategy for Learning Disabled Children”. The objective of the study was to develop multimedia instruction and study the significant difference if any in the achievement of teaching disable children learn algebra concept through multimedia instruction strategy. The finding shows that multimedia instruction facilitates the disabled children in learning algebra concepts rather than their counterpart in conventional teaching group.

Paranjape, V.G. (2001) studied on “Development of an Instructional System for Mathematics through Content-cum-Methodology Approach”. The objective of the study was to analyse the traditional approach and content-cum-methodology (CCM) approach of teaching mathematics. The finding revealed that instructional system for mathematics developed under the study was more effective than conventional instructional system for students and pupil teachers.

Atan, H. Ratiman, A.Z. Azil, A.Z. Idrus, M.R. Ismail, and Saleh, M.N. (2002) studied on “Teaching of Science in Distance Education: Comparative studies between Audio-Graphics and Face-to-Face.” The objective of the research was to compare the difference in learning outcomes of the interactive audio-graphics teaching with that of the traditional face-to-face teaching of students enrolling in the under graduate science course, namely physics, mathematics and biology. The researcher found that learning outcomes of the audio-graphics delivery system were as successful as the conventional face-to-face one for all the course investigated and students perceived the writing on the white board during the face-to-face delivery as more intelligible than the writing on the tv screen during the audio-graphics delivery.

Balasubramanan, N. and Meera, S. (2002) studied on “Relative Effectiveness of Different Models of Computer Based Instruction in Teaching Biology”. The objective of the study was to find out the significant difference among the different models of computer assisted instructional strategy viz. Tutorial, Drill and practice in realizing the instructional objective in Biology at standard XI. The researcher found that CAI is more effective than the tutorial and simulation models in teaching biology at standard XI.

Sharma, A. and Sansanwal D. N. (2002) studied on “Comparison among Video Based Instructional Strategies for Teaching Science at Class IX level in terms
of Achievement.” The objective of the study was to compare the mean scores of achievement of students in Science belonging to different video based instructional strategies for teaching science at class IX level. The researcher found that the treatment had significant effect on achievement in science belonging to different video based instructional strategies for teaching science. The video viewing followed by lecture as well as video viewing followed by discussion were significantly higher than those of video viewing only. The mean score of science achievement of video viewing followed by lecture was found to be significantly superior of video viewing followed by discussion.

**Kumar, S. and Anita (2004):** Their study was entitled, “Effectiveness of Self-learning Module in Mathematics in Relation to Classroom Environment”. The objectives of the study were: (1) To study the effectiveness of self-learning modules, in terms of achievement of students; (2) To study the effectiveness of classroom environment on achievement of students; and (3) To study the interaction of mode of teaching and classroom environment. The pre-test and post-test were administrated. The researchers found (1) Both the variables self-learning module and class environment cannot be ignored in respect to their effect of achievement; (2) There was no interaction between mode of teaching and classroom environment.

**Jothikani, N. and Thiagarajam, A.P. (2004):** Their study was entitled, “Effectiveness of Computer Assisted Instruction in Mathematics among B.Sc. Degree Students”. The objectives of the study were (1) To analyse the efficiency of teaching mathematics through computer assisted instruction over conventional method; (2) To compare the effectiveness of teaching mathematics through computer assisted instruction over conventional method in terms of the level of achievement and (3) To study the effectiveness of teaching mathematics through computer assisted instruction over conventional method in terms of objectives of teaching. The researchers used pre-test and post-test design and found the conventional method more effective and efficient than computer assisted instruction method.

**Vaishnav, R. and Parashar, G.S. (2005)** studied on “Effectiveness of Computer Aided Instruction for Teaching Biology.” The objective of the study was to develop computer aided instruction in biology on topic “Food Nutrition and Health” and study its effectiveness in comparison to traditional method. The researcher found
that the computer aided instruction material was effective in terms of the achievement and superior than the traditional method when intelligence was taken as co-variate.

Ellaisamy, M.(2007) conducted a study “Effectiveness of Multimedia Approach in Teaching Science at Upper Primary Level”. The pupils of the experimental group achieved more than the pupils of the control group in science at upper primary level. The pupils of the experimental group have improved than the pupils of the control group in their scientific attitude. This is due to the favorable impact of the multimedia approach in the learning of the VIII standard pupils.

Jyothi, K.B.S. (2007) her study was entitled, “Impact of Computer-based Learning on Students of Chemistry”. The objectives of the study were (1) To prepare a self-instructional module on the topic of “Chemical-bond” for 9th class and (2) To compare the effectiveness of this self-instructional module with conventional teaching method. The researcher used experimental research design. The researcher found that the students were better motivated and interestingly participated in computer based learning. They did not hesitate to clarify their doubts through computer based learning.

Kannan, M. (2007) conducted a study “A Study of Effectiveness of Use of Computer Technology in Teaching the Concepts of Physics at Senior Secondary Level.” The computer assisted teaching is the best method to teach the concepts of physics at senior secondary level. There is no much profitable learning by the students just by using computer technology to learn the concepts of physics without the aid of the teacher or by the traditional method of teaching physics.

Gupta, Madhu and Nagpal, Chirag (2010) their study was entitled, “Developing and Implementing the Programme Instruction Material of Physics for Senior Secondary School Students”. The objective of the study was to develop and implement programme in branching style and compare the effectiveness of programme instruction method and expository method in teaching on the selected concepts of physics. The researchers adopted pre-test and post-test experimental design. The researchers found that the experimental group achievement score was higher than the control group and the retention test achievement score was higher in favour of experimental group.

Singh, Y. G.(2010) conducted “A Study of Effectiveness of Multimedia Programme in Teaching Biology”. The study was conducted to develop a multimedia
programme for the teaching of Biology, and experimenting the same with a set of students studying in the XIIth standard and finding out its effectiveness over the traditional method of teaching. Pre-test and Post-test equivalent groups design was followed for this study. The result shows that the students learning through multimedia programme are found to be better than the students learning through traditional method of teaching.

Angadi .G.R. (2011) studied the “Development and Validation of Multimedia Package in Biology”. The objective of the study was to develop and validate multimedia package on “the study of cell” and to compare the multimedia instruction and traditional method. The experimental pre-test and post-test equivalent group design was adopted for the study. The researcher found that students taught by multimedia package method scored more than traditional method of teaching.

Sumi, tharwin and Benjamin, A. Edward William (2011) studied on “Effectiveness of Multimedia in Teaching of Physics for 11th Standard School in Puducherry region.” The objective of the study was to develop a multimedia package and study the effectiveness of multimedia approach over the conventional method in teaching of physics for 11th standard students. Experimental method was adopted for the investigation of the study. The researcher found that there was significant difference between the achievement of experimental group and control group in the post test.

Mehar, Ram and PariharPreeti (2011) studied the “Effect of Computer Assisted Instruction on Achievement in Physics in Relation to Cognitive Style.” The objectives of the study were (1) To compare the performance of group taught through computer assisted instruction and conventional method of teaching. (2) To study the performance of students having different levels of cognitive style. (3) To examine the interaction effect between computers assisted instruction of teaching and cognitive style. The pre-test and post-test factorial design was used in present study. The findings were that the achievement score in physics of students taught through computer assisted instruction was significantly higher than those who were taught through conventional method and the mean of the field independent group was higher than that of field-dependent group.

Ancy, A.S. (2012) studied the “Effectiveness of Computer Assisted Instruction in Teaching and Learning of Mathematics.” The objective of the study was to prepare computer assisted instruction model for learning algebra at secondary level
and compare the effectiveness of computer assisted instructional model by comparing the achievement scores of computer assisted instruction group and conventional method group in terms of achievement in mathematics among secondary school students. The researcher adopted experimental method with a non-equivalent group, pre-test and post-test experimental design having experimental and control group. The researcher found that comparison of pre-test and post-test achievement scores of treatments groups revealed that there was significant difference between the computer assisted instructional group and conventional method group with regard to post test achievement scores.

Pal, Sujit. Sana, S. and Ghosh,A. (2012) studied on “Influence of Interactive Multimedia Courseware: A Case Study among the Students of Physical Science of Class VIII”. The objective of the study was to study the influence of interactive multimedia courseware on the achievement in Physical science of class VIII students. The researcher found that computer assisted multimedia courseware facilitates learning in physical science better than the traditional chalk and talk method.

Devar, Monika (2013) has conducted the research study on “The Effectiveness of Cooperative Learning Chemistry at Secondary level”. The objective of the study was to examine the influence of cooperative learning approach on learners’ academic performance in chemistry, irrespective of their individual ability level. It was analyzed from findings that cooperative learning approach is equally beneficial to learners irrespective of their individual ability level.

Khasnis, B.Y. (2013) studied on “Enhancement of Mathematics Learning through Computer Assisted Instruction.” The objective of the study was to find out the relative effectiveness of computer assisted instruction and conventional instruction in terms of academic achievement of IX standard students and compare the relative effectiveness of computer assisted instruction and conventional instruction in terms of academic achievement among girls and boys of IX standard. The researcher found the positive outcomes on the IX standard student’s immediate achievement in mathematics, attitude towards mathematics and computer assisted learning and the girls have higher achievement.

Jayshree, T.K. (2013) studied the “Effectiveness of an Instructional Module Based on Select Models of Teaching for Enhancing Mathematical Abilities among
Senior Secondary School Student.” The objective of the study was to develop an instructional module for the topic-polynomials in mathematics at secondary school level based on the theories of concept attainment model, inductive thinking model and inquiry training model. The researcher adopted experimental and survey method for the present study. The researcher found that the instructional module was more effective than the existing practices of activity method for enhancing mathematical abilities among senior secondary school students and more effective with respect to retention of information in learning mathematics.

**Sankhala, D.P. (2013)** has conducted a research study on the “Use of Self Learning Method for Effective Science Teaching”. The objective of the study was to ascertain the impact of teaching with the help of Self Learning Method over Traditional Method. The results showed that self-learning method is more effective. Students of standard VII show improved performance when they study content matter on their own.

**Sheeba, L. & G. R. Santosh (2013)** have conducted study on “A Comparative Study on the Effectiveness of Self Learning Module and Multimedia Instruction Material for Enhancing the Awareness of VHSE Students of Freshwater Ornamental Fish Culture and Aquarium Maintance.” The objectives of the study were (1) To prepare a Self Learning Module (SLM) on Freshwater Ornamental Fish Culture (FOFC) and Aquarium Maintance (AM) and to test its effectiveness on the basis of mean pre and post test scores (2) To prepare a Multimedia Instruction Material (MMIM) on FOFC & AM and to test its effectiveness on the basis of mean pre and post test scores (3) To compare the effectiveness of SLM and MMIM for enhancing the theoretical and occupational awareness of VHSE students on FOFC & AM. The researcher found that (1) SLM was effective for enhancing the theoretical awareness, theoretical and occupational awareness of sample on FOFC & AM (2) MMIM was more effective than SLM for enhancing the theoretical awareness of the sample on FOFC & AM. (3) MMIM was more effective than SLM for enhancing the occupational awareness of the sample on FOFC & AM.

**Panneerselvam, S. K. (2014)** studied on “Effectiveness of Educational Software on Achievement in Chemistry among Standard XI Students.” The objective of the study was to investigate the effectiveness of educational software on achievement of students. Researcher found that eureka educational software was more
suitable method for teaching chemistry at XI standard level. Eureka educational software is one of the best method in the teaching learning process of chemistry for XI standard students.

**Sharma, K. (2014)** studied on “Effectiveness of Concept mapping Strategy on Students’ Achievement and Concept Retention in Organic Chemistry”. The objective of the study was to investigate the effectiveness of concept mapping strategy on achievement and concept retention in organic chemistry of class XII science students belonging to higher intelligence and lower intelligence group. The researcher found that (1) experimental group was found to attain significantly higher achievement scores and retained more in both higher and lower intelligence group as compared to the control group. (2) Higher intelligence experimental group was found to attain significantly higher achievement scores and retained more as compared to the lower intelligence experimental group.

**Darsana, B.G. and Rajeswari, K. (2014)** studied on “Effectiveness of a Multimedia Package as Self Learning Material for Enhancing Achievement in Chemistry at Secondary Level.” The objective of the study was to test the effectiveness of the multimedia package as a self-learning material by comparing the achievement in chemistry of the treatment group viz. activity oriented method as control group and multimedia package as self-learning material as experimental group. The present study indicate that the self-learning multimedia package is very effective than that of the traditional way of teaching. The students who were taught chemistry through multimedia package had shown significant improvement in their achievement.

**Joshua, E. (2015)** studied on “Folklore Based Model of Teaching on Scientific Creativity.” The present study was examined the effectiveness of folklore based model on scientific creativity among students of standard of VIII. The experimental method was adopted for the study. The study was conducted among sixty students of standard VIII. The experimental group was treated with the folklore based model of teaching while the control group was treated with the activity method. The present study indicates that folklore based model of teaching is effective in enhancing scientific creativity.
2.1.2 Studies related to Teaching of other Subjects

Many Indian researches have been conducted in the field of Self-learning Package, Advance organiser Model, Learning-centric Approach, Picture-word Inductive Model, Computer Instruction Strategy, Cooperative Learning, Self-learning method, Multimedia Instructional Strategy, Computer based Instruction Models, Concept mapping, Multimedia Programmes and Computer based Modules. Some are discussed below.

Singh, H. S. (2002) has conducted a research study on “Effectiveness of Module on Management of Educational Institution (B. Ed. Courses) in terms of Achievement and Educational Aspiration.” The objective of the study was to compare the mean score of achievement of students treated with those taught through traditional method and compare the mean score of educational aspiration of students treated with module with those taught through traditional method. The researcher found that mean achievement scores of students treated with module were significantly higher than the mean achievement scores of students taught through traditional method and there is no significant difference between the educational aspirations of students of both groups.

Desai, Beena Y. (2004) conducted “A Comparative Study of the Efficacy of Teaching through the Traditional Method and the Multimedia Approach in the Subject of Home Science.” It is an experimental study which has employed experimental group and control group design. The sample of the study constituted of 98 students of B.A. first year Home Science (2001-2002) of Smt. J.P. Shroff Arts College, Valsad. The students were found to have favourable opinions towards the multimedia approach. The study has found the relative efficacy of teaching through the traditional method and the multimedia approach in the subject of Home Science, particularly, Proteins.

Hemamalini, H.C. and Yeshodhara, K. (2006) their study was entitled, “Impact of a Learning-centric Approach on the Achievement Level of Using Auxiliary Verbs among the Students of Standard 8th.” The objectives of the study were (1) To study the impact of the Learning-centric teaching approach on the achievement level of using auxiliary verbs among the students of standard 8th and (2) To find the difference between boys and girls in the achievement level in using auxiliary verbs. The researchers used two groups (experimental and controlled) post-
test design. The findings were (1) The learner-centric teaching approach was effective in making the students learn the auxiliary verbs effectively and (2) There were no significant differences between boys and girls in the achievement levels in using auxiliary verbs.

Ganesh, G.M. (2007) studied on “An Experimental Study on the Effectiveness of Activity Oriented Programs for Improving Listening and Reading Comprehension Abilities of Secondary School Students.” The objective of the study was to prepare programs to improve the listening and reading comprehension ability in the Kannada language. The researcher found that there was significance difference in the scores of intelligence and reading comprehension after administrating the program.

Ragasa, Y (2008) did a study on, “A Comparison of Computer Assisted Instruction and the Traditional Method of Teaching Basic Statistics”. The objectives of the present study were (1) To determine the effect of the treatment and the control groups on achievement as measured by the post test. (2) To determine the effect of the treatment and control groups on attitude as measured by the post test. The researcher used quasi-experimental, non-equivalent control group design. The researcher found that the mean score of post-test of the achievement test of the treatment group was significantly higher than that of the control group and there was no significant difference in the mean score of the attitude post-test of the treatment group and the control group.

Kumar, Shiva raj and Kanchan (2010) their study was entitled, “Programmed Instruction: An Effective Method of Teaching”. The objective of the study was to develop branching and linear programme on biological concepts at high school standard and compare the effectiveness of branching, linear programming and lecture method. The researcher adopted pre-test and post-test factorial design for the present study. The researcher found that achievement scores in physics of students taught through computer assisted instruction group was significantly higher than those who were taught through conventional method.

Barot, M. Harialkumar (2011) studied on “Development and Try out of Software for Teaching Sanskrit Prose for Class VIII.” The objective of the study was to develop computer assisted instruction on Sanskrit prose for standard VIII students and study the effectiveness in terms of achievement of students and reaction of
standard VIII students on computer assisted instruction developed by investigator. The investigator revealed that the computer assisted instruction developed by the investigator on the selected chapter of class VIII Sanskrit prose was found to be effective in terms of the achievement of the learners and their reaction.

**Kumar, K.S. Kiran (2011)** studied on “Teaching Grammar through Multimedia to Rural Secondary School Students”. The objective of the study was to finout the effectiveness of multimedia to secondary school students for teaching of grammar. Research evidenced indicates that the Multimedia presentation can improve student’s performance; therefore Multimedia presentation being an innovative approach to teaching-learning process endless drill and practice without repetition, and provides immediate feedback to the learner on his/her progress.

**T. Enok, Joel (2011)** undertook a study “Influence of Multimedia in Enhancing Attitudes towards Computer Science at Higher Secondary Level.” The objective of the study was to findout the influence of multimedia in enhancing attitude towards Computer science. Multimedia package has influence on the attitude towards Computer Science. It is observed that method of teaching with modern tools matters to develop attitude among students.

**Tholappan, A. and Krishna kumar, R. (2011)** studied on “Effectiveness of Computer Assisted Instruction in Learning Economics at Higher Secondary Level.” The objective of the study was to find out the difference between computer assisted instruction and conventional method of instruction on achievement in learning economics at plus one level. The researcher found that achievement of students at plus one level on learning Economics through CAI is more than the students’ achievement through the conventional method of instruction.

**Agrwal, A. and Chaurasia, S. (2012)** studied on “Teaching Effectiveness of Advance Organizer Model: An Experimental Study.” The aim of the study was to findout the instructional effect of Advance Organizer Model on the basis of the achievement of the students and Conventional Method in teaching civics. The researcher found that both the group taught through Advance Organizer Model and Traditional Method has gain significantly but the Advance Organizer Model is more effective than the Conventional Method as the difference favours the group which received instruction through the Advance Organizer Model.
George, Rechel, M. (2012) studied the “Effectiveness of Self Learning Package in Developing Awareness about Communicable Disease among Future Secondary School Teachers.” The objectives of the study was to understand the awareness about communicable diseases and test the effectiveness of the prepared self-learning package in developing awareness about communicable diseases. Survey and experimental methods were used for the study. The researcher found that prepared learning package was more effective than the conventional lecture method in enhancing the awareness in the area of communicable diseases and the experimental group who learned with the help of learning package attained high awareness in the area of communicable disease than those who were taught through conventional lecture method.

Mahmood, K. M. and Mirza, S. M. (2012) studied on “Effectiveness of Computer Assisted Instruction in Urdu Language for Secondary School Students’ Achievement in Science.” The objective of the study was to examine the effectiveness of the computer assisted instruction on students’ achievement in general science as compared with the traditional method of instruction (TMI). The researcher found that the experimental group performed on all the three components of the achievement test as compared to control group. The computer assisted instruction group also scored higher than the traditional method of instruction group in various content areas of general science.

Chiniwar, S. Prabha (2013) studied on “Effectiveness of CAI among the VIII standard students in relation to the Attitude towards English Grammar.” The objective of the study was to compare the effectiveness of CAI and conventional method of teaching grammar in terms of changing the attitude and enhancing the achievement of students in English grammar. The researcher found that teaching English grammar through CAI is more effective in changing the attitude and enhancing achievement of students in English grammar.

Chhabra, S. and Dhamija, N. (2013) studied on “Comparative study of Computer Assisted Instruction Technique (CAI) and Conventional Teaching (CI) on the Achievement of Pupil Teachers in Methods of Teaching English Language.” The objectives of the study were (1) To develop and validate the instruction material for CAI for teaching method of English language (2) to compare the effect of CAI and CI on the achievement of pupil teachers in teaching methods of English language.
researcher found that CAI was more effective than the CI of teaching in improving the achievement of pupil teacher for learning all the teaching methods of teaching English language. This finding of the study indicate the pupil teachers exposed to CAI achieved higher scores in teaching of English than who were taught by conventional teaching (CI).

Sharma, Pratibha (2013) studied on “Role of Interactive Multimedia for Enhancing Students’ Achievement and Retention.” The objective of the study was to study the role of interactive multimedia for enhancing students’ achievement and retention. The researcher concludes that interactive multimedia method was found more suitable with respect to the marks achieved by them in English.

Tamil Selven, R. M. (2013) studied the “Effectiveness of 3R Techniques in Learning of Definitions in Educational Psychology.” The objective of the study was to test the effectiveness of the 3R (root, route, fruit) Techniques in teaching and learning definitions in Educational Psychology of the B.Ed. trainees. The researcher adopted parallel group pre- test and post-test design. The researcher found that there was no significant difference between the post test score of the control group and the experimental group.

Ushadevi, V.K. and Anu, S. (2013) studied on “Effectiveness of Teacher Assisted Learning Package on Biodiversity Conservation in Developing Knowledge, Process skill, Confidence and Attitude towards Biodiversity Conservation among Students in Secondary Schools.” The objective of the study was to find out the effectiveness of the teacher assisted learning package on biodiversity conservation in terms of (a) gain the knowledge in biodiversity (b) increase in process skill confidence in biodiversity conservation, (c) gain in favourable attitude towards biodiversity conservation. The researcher found that the teacher assisted learning package on biodiversity conservation was effective in terms of increase in process skill confidence in biodiversity conservation and more favourable attitude towards biodiversity conservation among students in secondary schools.

Lavina, D. & Mollykutty, T.M. (2014) studied on “Effectiveness of The Picture –Word Inductive Model of Teaching on Spelling Competence in English among Pupils of Standard Five.” The objective of the study was to compare the effectiveness of the instruction based on picture-word inductive model and the
existing teaching method on spelling competence in English between the Experimental and control group of Malayalam medium pupils of standard five. The researcher found that picture-word inductive model is more effective than the existing method of teaching in developing spelling competence in English among pupils of standard five.

**Meenakshy, R.S. (2014)** studied on “Computer Assisted Approach for Developing Spelling Skills of Upper Primary level Students.” The objectives of the study was to develop computer assisted package for remedial instruction for backward spellers in English and test the effectiveness of the computer assisted package in improving spelling skills of backward spellers at the upper primary level. The researcher found that the experimental group and the control group differ significantly. Thus it can be stated that the spelling skill of the backward spellers of the experimental group subjected to the computer assisted package has improved with reference to the control group.

**P. S. Pragathi, G. Vijayalkshmi (2014)** studied on “A Study on Achievement in Social Studies through Computer Assisted Programmed Instruction.” The purpose of the study was to develop and find effectiveness of computer assisted programmed instruction in social studies and to compare with traditional instruction on the same topic taught by the teacher through traditional instruction method. The researcher found that both the groups at this level are not alike in their achievement. This shows computer assisted programmed instruction enhanced the achievement of students and revealed a clear superiority of computer assisted instruction over traditional instruction.

**Husain, N. (2015)** studied on “Effectiveness of Cooperative Learning Method on the Lesson Planning Abilities of Pre-Service Teachers.” The present study aimed to study the effectiveness of cooperative learning method on the lesson planning abilities (LPA) of pre service teachers. Quasi experimental research design was employed for the present study. For the purpose of experiment, 17 students were chosen for control group and 17 students randomly selected for the experimental group. The study clearly shows that cooperative learning develops in pupil-teachers all those necessary knowledge, skills and behaviors that are essential to make lesson plans.
2.2.0 Studies conducted abroad

2.2.1 Studies related to Science Teaching

Many board researches have been conducted in the field of Interactive multimedia Package, Virtual Laboratory, Simulation Games, Interactive Whiteboard, Computer Instruction Strategy, Cooperative Learning, Self-learning method, Multimedia Instructional Strategy, Computer based Instruction Models, Concept mapping, Multimedia Programmes and Computer based Modules. Some are discussed below.

**Nimavathi, N. and Gnanadevan, R. (2008)** studied on the “Effectiveness of Multimedia Program in Teaching Science.” The objective of the study was to prepare the multimedia package and find out the effectiveness of computer multimedia program in teaching of science at secondary level. The researcher found that the students learning with the help of multimedia program gained better score in science than the students learning through the conventional method.

**Tuysuz, C. (2010)** studied on “The Effect of the Virtual Laboratory on Students’ Achievement and Attitude in Chemistry.” The objective of the study was to investigate the effect of the virtual laboratory related to “separation of matter” on students’ achievement and attitude in chemistry. The researcher found that virtual laboratory application made positive effects on students’ achievement and attitudes when compared to traditional teaching method.

**Yusuf, O. M. and Afolabi, O. A. (2010)** studied on “Effects of Computer Assisted Instruction (CAI) on Secondary School Students’ Performance in Biology.” The objective of the study was to investigate the effect of computer assisted instruction on secondary school students’ performance in Biology. The researcher found that the performance of students exposed to computer assisted instruction either individually or cooperatively were better than their counterparts exposed to the conventional classroom instruction.

**Shaik Fehameeda and Humiera Jawad (2012)** studied on the “Effectiveness of CAI Program in High School Biology.” The objective of the study was to prepare on one unit of Biology and implement the program on students of standard IX as Experimental and control group. The researcher found that learning through CAI program is more enjoyable and self-motivated as learning may be due to novelty of
the teaching-learning process where the individual students are motivated, attentive and active throughout the program.

**Chaudhari, P. (2013)** studied on “Computer Assisted Instruction (CAI): Development of Instructional Strategy for Biology Teaching.” The objective of the study was to develop the instructional strategy for Biology Teaching. The researcher found that Computer Assisted Instruction is very useful for the achievement of students in Biology.

**Vaishnav, R. and Parage, P. (2013)** studied on “Innovative Instructional Strategies Interactive Multimedia Instruction and Computer Aided Instruction for Teaching biology.” The objective of the study was to compare the effectiveness of Innovative Instructional Strategies Interactive multimedia Instruction and Computer Aided Instruction for Teaching biology. The researcher found that interactive multimedia instruction (IMI) is more effective than computer assisted instruction (CAI).

**Sowunmi, O. and Aladejana, F.(2013)** studied on the “Effect of Simulation Games and Computer Assisted Instruction on Performance in Primary Science.” The objective of the study was to examine the effect of simulation games and computer assisted instruction on teaching basic science among lower primary school pupils. The researcher found that there is no significant difference in the performance of pupils exposed to simulation games and computer assisted instruction. The simulation games can be very useful in improving teaching and active learning or learning by doing especially when there are minimal facilities for computer assisted instruction.

**Binaraj, A., Sankaranarayanapanaleeri and celineperrira (2014)** studied on the “Construction and Validation of Individualized Audio Instruction Material for Enhancing Teaching of Physics.” The objective of the study was to develop audio instructional material to enhance teaching in the selected content and determine the extent of effectiveness of the individualized audio instructional material based method in teaching of physics. The researcher found that individualized audio instruction material based teaching is effective in teaching physics. The individualized audio instruction material is effective in self-learning also. Hence, this material is an effective device for teaching and learning in physics for high school students.

**Yang, K.T. and Wang, T.H. (2014)** studied on “Interactive White Board: Effective Interactive Teaching Strategy Designs for Biology Teaching.” The objective of the study was to design interactive teaching strategies with interactive whiteboard
and investigate their effectiveness on Biology Teaching. The researcher found that compared to traditional information and communication technology integrated instruction, interactive white board is more effective in improving student learning.

2.2.2 Studies related to Teaching of other Subject

Many abroad researches have been conducted in the field of Self-directed Learning Activity, Interactive Multimedia Package, Computer Instruction Strategy, Cooperative Learning, Self-learning method, Multimedia Instructional Strategy, Computer based Instruction Models, Concept mapping, Multimedia Programmes and Computer based Modules. Some are discussed below.

**Basturk, R. (2005)** studied on the “Effectiveness of Computer Assisted Instruction in Teaching Introductory Statistics.” The objective of the study was to demonstrate and discuss the educational advantages of computer assisted instruction in teaching introductory statistics. The researcher found that participants’ learning capacity of the introductory statistics could be improved successfully when computer assisted instruction is used as a supplement to regular lecture in teaching introductory statistics course.

**Kaundaliya, D.P. (2005)** studied on “A Study of an Effectiveness of Self Learning Material for the Teaching of Basic Concepts of Accountancy.” The objective of the study was to construct and study the self learning material on comparison of traditional method for teaching of the basic concept of the subject accountancy in standard XI. The researcher found that the self-learning material was more effective than lecture method in teaching of the subject Accountancy in standard XI.

**Cepni, S., Tas, E. and Kose, S. (2006)** studied on the “Effect of Computer Assisted instruction Material on Students’ Cognitive Levels, Misconceptions and Attitude Towards Science.” The objective of the study was to investigate the effect of a computer-assisted instruction material related to “photosynthesis” topic on student cognitive development, misconceptions and attitudes. The researcher found that using computer assisted instruction material (CAIM) in teaching Photosynthesis topic was very effective for students to reach comprehension and application levels of cognitive domains.
Onasanya, S. A., Daramola, F. O. and Asuquo, E. N. (2006) studied on “Computer Assisted Instructional Package on Secondary School Students’ Performance in Introductory Technology in Ilorin, Nigeria.” The purpose of the study was to investigate the effect of computer assisted Instructional (CAI) package on the performance of secondary school students in introductory teaching in Ilorin, Nigeria. The researcher found that students using the computer assisted instructional package performed better than conventional method.

Varank, I. (2006) studied on “A Comparison of a Computer Based and A Lecture Based Computer Literacy Course: A Turkish Case.” The objective of the study was to compare the attitude and motivation of those who participated in a classical lecture based computer literacy course. The researcher found that there is no significant difference between computer based instruction group and lecture based instruction group student attitude scores.

Junaidu, S. (2008) studied on “Effectiveness of Multimedia in Learning and Teaching Data Structure online.” The objective of the study was to investigate the effectiveness of multimedia in learning and teaching data structure online. The researcher found that an online data structure course over five years offerings students consistently perform much better in question requiring application of material taught in carefully animated algorithms.

Noordin, S., Ahmad, W. and Hooi, Y. (2011) studied on “Effectiveness and Usability of Multimedia Courseware Integrated with 3-dimensional Model as a Teaching Aid.” The objective of the study was to study the effectiveness and usability of multimedia courseware integrated with 3-dimensional model as a teaching aid. The researcher found that students who used the multimedia courseware scored significantly higher than the students who learned the topic by conventional method.

Serin, O. (2011) studied on the “Effect of the Computer Based Instruction on the Achievement and Problem Solving Skill of the Science and Technology Students.” The objective of the study was to investigate the effect of the computer-based instruction on the achievement and problem solving skill of the science and technology students. The researcher found that there was a statically significant increase in the achievement and problem solving skills of students in the experimental group that received the computer based science and technology instruction.
Adeyemi, B.A. (2012) studied on “Effects of Computer Assisted Instruction (CAI) on Students’ Achievement in Social Studies in Ousun State, Nigeria.” The objective of the study was to investigate the effects of computer assisted instruction on junior secondary schools’ achievement in social science. The researcher found that student exposed to computer assisted instruction did not perform significantly better in their achievement in social studies than those students exposed to conventional method of instruction.

Cheng, N., Cheng, J. and Chen, D. (2012) studied on “The Effect of Multimedia Computer Assisted Instruction and Learning Style on Learning Achievement.” The main purpose of this study was to investigate 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. The researcher found that under the influence of multimedia instruction students exposed to the four learning styles (Diverger, Assimilator, Converger and Accommodator) do not show any significant difference.

Dhevakrishan, R., Devi, S., &Chinnaiyan, K. (2012) studied on “Effectiveness of Computer Assisted Instruction (CAI) in Teaching Mathematics at Secondary level.” The objective of the study was to investigate the effectiveness of computer assisted instruction (CAI) in teaching of mathematics at secondary level adopted experimental method and observing the difference between computer assisted instruction and traditional method. The researcher found that computer assisted instruction is an effective media of instruction for teaching mathematics at secondary level and the experimental group showed better performance in learning.

Ramani, P. and Patadia, H. (2012) studied on “The Effectiveness of Computer Assisted Instruction in Teaching Arithmetic.” The objective of the study was to investigate the effectiveness of traditional instruction, only computer assisted instruction and computer assisted instruction with simultaneous discussion. The researcher found that traditional method is as effective as computer assisted instruction. Computer assisted instruction with simultaneous discussion is more effective than traditional method. Computer assisted instruction with simultaneous discussion is more effective than only computer assisted instruction.
Dange, J.K. (2013) studied on “Effectiveness of Computer Assisted Instruction in the Development of Study Habits in Relation to the Gender, Locality and Socio-economic Status of Secondary School Students.” The purpose of the study was to find out the effectiveness of computer assisted instruction in the development of study habits in relation to gender, locality and socio-economic status of secondary school students. The researcher found that computer assisted instruction was more effective than conventional method of teaching science in developing study habits. Significant effect of gender, locality and socio-economic status was not found on the development of study habits when students learnt through computer assisted instruction.

Barlis, M. J. and Fajardo, D. J. (2013) studied on “Effectiveness of Simulation and Computer Assisted Instruction (CAI) on the Performance of Students Under Regimental Training on Selected topic in Physics II.” The objective of the study was to investigate the effectiveness of simulation and computer assisted instruction (CAI) on the performance of students under regimental training on multiple choice questions and problem solving on selected topics in physics II. The researcher found that the performance of both groups, students’ score increased significantly from the pre-test to the post test, in both multiple choice questions and problem solving regardless of the method used. Both traditional and experimental method, individually are effective in teaching the students.

Yang, D.C. and Li, M.N. (2013) studied on “Assessment of Animated Self Directed Learning Activities Modules for Children’s Number Sense Development.” The objective of the study was to examine the relative effectiveness of two different learning modules; namely, a computer animation self directed learning approach and a paper version of self directed learning approach to 5th graders number sense development. The researcher found that student in the CAEG (computer animated experimental group) had better performance on number sense and showed more frequent uses of number sense than students in the PAG (paper version group) group.

Shirvalkar, R.R. (2014) studied on “Effectiveness of computer Assisted Instruction (CAI) in Teaching of Trigonometric functions at +2 level.” The objective of the study was to investigate the effectiveness of computer assisted instruction (CAI) in teaching of mathematics at +2 level adopted experimental method and
observing the difference between computer assisted instruction and traditional method. The researcher found that computer assisted instruction is an effective media of instruction for teaching mathematics at +2 level and experimental group taught by experimental method showed better learning.

2.4.0 Discussion of related literature:

The study of the literature related to the research question provides through knowledge about variables and methodology. All the above mentioned studies have been reviewed conceptually and methodologically. Researcher gets help in taking decision about research design and analysis process. These have been discussed as under the captions given below.

2.4.1 Review of related literature in relation to conceptual framework:

After going through the educational research done in India and abroad the researcher sees the kinds of research were done regarding cooperative learning approach, self-learning material, multimedia instruction, learner centric approach, self-learning module, instructional module, programmed instruction and CAI with science and other subjects. These studies also reveal that teaching-learning becomes more interesting, joyous and prolonged. These observations can be summarized is as follows:


Sansanwal D. N. (2002), Ganesh, G.M. (2007), Tuysuz, C. (2010) and Binaraj, A., Sankaranarayananpaleeri and celineperrira (2014) revealed that audio and video based teaching learning methods increase the learning skills, performance of students and improve the attitude of teachers for teaching through audio video based teaching methods. Atan, H. Ratiman, A.Z. Azil, A.Z. Idrus, M.R. Ismail, and Saleh, M.N. (2002) have found that learning outcomes of the audio-graphics delivery system were as successful as the conventional face-to-face one for all the course investigated and students perceived the writing on the white board during the face-to-face delivery as more intelligible than the writing on the tv screen during the audio-graphics delivery. Gupta, Madhu and Nagpal, Chirag (2010), Kumar, Shiva raj and Kanchan (2010) and Vaishnav, R. and Parage, P. (2013) have found that positive impact of instructional strategy on teaching learning process and performance of school students. Tamil Selven, R. M. (2013) found that positive effect of 3R Techniques in Learning process in Educational Psychology of the B.Ed. trainees. Hemamalini, H.C. and Yeshodhara, K. (2006) and Ushadevi, V.K. and Anu, S. (2013) indicated that learner centric approach and teacher assisted learning package improved the achievement level of students and developed the knowledge process skill and confidence and attitude of students. Barot, M. Harialkumar (2011) revealed that the computer assisted instruction developed by the investigator on the selected chapter of class VIII Sanskrit prose was found to be effective in terms of the achievement of the learners and their reaction.

The research has been benefited by these studies, on the variables the researcher has chosen for her research. In the same way the studies done on multimedia approach, computer assisted instruction, instructional strategy Pal, Sujit. Sana, S. and Ghosh, A. (2012), Singh, Y. G. (2010), Darsana, B.G. and Rajeswari, K. (2014) and Sharma, A. and Sansanwal D. N. (2002) have helped the researcher in her work and supported the researcher for the interviewing variables. The studies done on school students, college students and community members have supported the researcher very much. With the help of these studies researcher has learnt about the tactics students adopt to cope up with the science learning difficulties.

There may be so many factors which affect the science learning and academic achievement of Upper Primary Level of school students like gender, age, streams, status of school, type of school, environment and financial condition of students. It can be seen that there are so many studies which have been done on science learning but no research has been found which has been done on science learning and multimedia approach along with Upper Primary level with science students. So there is need to study the science learning of upper primary level school students in reference to multimedia approaches.

All these studies highlight the path and provide basis for conceptualizing the study and help in rising research questions.

2.4.2 Review of related literature in relation to Research design:

There are so many studies related to science teaching learning process and multimedia approaches which provide basis for research design. These studies showed that gender, streams, subjects, type of school, instructional methods can affected on science learning.

Adeyemi, B.A. (2012), Chaudhari, P. (2013), Vaishnav, R. and Parage, P. (2013), ShaikFehameeda and HumieraJawad (2012) and Nimavathi, N. and Gnanadevam, R. (2008) provide basis and direction for the selection of sample and population. Chhabra, S. and Dhamija, N. (2013) studied on Comparative study on computer assisted instruction technique (CAI) and conventional teaching (CT) on the achievement of pupil teachers in methods of teaching English language. The sample size of this study was 35 teacher educators. Sheeba, L. and Santosh, G. R. (2013) did a comparative study on the effectiveness of self-learning module and multimedia instructional material for enhancing the awareness of VHSE students on freshwater ornamental fish culture and Aquarium Maintance. The sample size of this study was 32 students. Lavina, D. and Mollykutty, T. M. (2014) studied on the effectiveness of the picture-word inductive model of teaching on spelling competence in English among pupils of standard five. The sample size of this was also 31 students. One another researcher Husain, N. (2015) studied on effectiveness of cooperative learning method on the lesson planning abilities of pre service teachers. The sample size of this study was 34 teacher educators. These studies provide basis and direction to researcher for the selection of sample.

effectiveness of instructional module. These studies provide a base and guidance to researcher for tool construction.


Thus it can be concluded that discussion of related literature has developed a deep insight into area of research. These literatures help the researcher to select the

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sample and research methodology. In this way by discussing related literature with reference to conceptual and methodological backgrounds the present study in planned and designed. Research design along with the methodological detail is presented in next chapter.