CHAPTER - 2
REVIEW OF RELATED LITERATURE

2.0 Introduction

With a view to develop an insight into the problem, the researcher studied the related literature available in the field of the problem. It helped in framing out the design of the research. The review of the literature studied is posited in this chapter under three titles i.e. theoretical basis, psychological basis and empirical basis. The use of computers in the classroom process gives the theoretical basis. Applicability of the learning principles and learning theories gives the psychological basis. Empirical basis throws light on the past research studies carried out in the present field along with the critical review of them as compared to the present study. The researcher studied methods, measures, approaches, treatments, teaching aids and experimental designs employed by previous researchers. Distinguishing characteristics of the present study are given at the end of the chapter.

THEORETICAL BASIS

2.1 Computers In The Classroom

In recent years, technology has assumed an increasingly important role in every aspect of instructional planning and design. The process began with the use of ‘visual aids’ in support of instructor-centered teaching, evolving until today, when we frequently see computers in the classroom. “While traditionally good teachers made use of blackboard, pictures, excursions, models, charts, slides, drama and graphs as audiovisual aids to education, along with these the modern teacher makes use of technological advances such as movies, radio, recording devices, television and computers.”

Modern languages teachers have traditionally dealt with many different media - print, audio tapes, videos, slide projectors, overhead projectors, flashcards, etc. Each has its own advantages as well as limitations, but all help the language learning process. Multimedia is electronic version of all these traditional media. In which all the traditional media can be combined, synchronized, and compared interactively. This kind of rich media experience is especially important “for the modern languages teacher for whom the spoken word is at least as important as the written”.2 "The ‘information age' has
clearly arrived," notes Kinnaman (1990), "and in the '90s the educational use of computer technology will surely continue to grow." ³ Today this we see to be true. Many educators, legislators, parents, and researchers have expressed concern about the educational effectiveness of using computers in schools.

Today more and more schools in India whether it be a school in urban area or rural area are being equipped with computers. School computing in India gained momentum with the project by government ‘Computer Literacy and Studies in Schools (CLASS)’. In this regard, NCERT (2001) has brought out the curriculum guide and syllabus for Information technology in schools within the general framework of education.

“For quite some time, computers have been a familiar sight in Indian schools. Yet a basic problem exists, i.e. computers are taught as a subject to be studied, rather than a tool to be used in practical life. Education must reflect the influence of technology upon both schools and society. This new technology demands new interpretations of the instructional process and those charged with educating the next generation must engage in a continual cycle of evaluation and reevaluation in the light of technological influence at all levels.” ⁴

When computers have emerged as a means in teaching-learning process the role of the teacher is surely to be affected. “There is a global experience that when information technology is used as a learning technology, the role of the teacher dramatically changes. If it does not, the innovation does not work.” ⁵ Thus, teachers have to become more prepared and ready to exploit the opportunities offered by the computers in teaching-learning process and continuously searching more creative uses of computer in his/her teaching.

2.2 Various Terms Used For Computer Delivered Instruction

There are a variety of terms used to describe the use of computer in education and each has a slightly different meaning.

1. Computer Based Education (CBE) and Computer Based Instruction (CBI). Are the broadest terms and can refer to virtually any kind of computer
use in educational settings, including drill and practice, tutorials, simulations, instructional management, supplementary exercises, programming, database development, writing using word processors, and other applications. These terms may refer either to stand-alone computer learning activities or to computer activities, which reinforce material introduced and taught by teachers.

2. **Computer Managed Instruction (CMI).** Can refer either to the use of computers by school staff to organize students’ data and make instructional decisions or to activities, in which the computer evaluates students' test performance, guides them to appropriate instructional resources, and keeps records of their progress.

3. **Computer Enriched Instruction (CEI).** Is defined as learning activities in which computers (1) generate data at the students' request to illustrate relationships in models of social or physical reality, (2) execute programmes developed by the students, or (3) provide general enrichment in relatively unstructured exercises designed to stimulate and motivate students.

4. **Computer Assisted/Aided Learning (CAL) and Computer Assisted/Aided Instruction (CAI).** Computers in teaching learning process are often referred to as Computer Assisted/Aided Learning/Instruction (CAL/CAI). Computer Assisted/Aided Learning/Instruction is concerned with the use of computers to mediate in the flow of information in the learning process. This information is stored in the computer and is made available to the learner rapidly and readily.

5. **Computer Aided/Assisted Language Learning (CALL).** Computer Aided/Assisted Language Learning (CALL) is a relatively new and rapidly evolving academic field of computer delivered instruction. It explores the role of information and communication technologies in language learning and teaching, CALL activities exploit improved technology to produce highly interactive learning environments,
providing effective support for the acquisition of listening, speaking, reading, and writing skills.

The CALL Programme can be developed for the various areas of language learning, like grammar, listening, pronunciation, reading, comprehension, vocabulary and writing of any language.

Levy (1997) provides the following succinct definition of CALL: "Computer Assisted Language Learning (CALL) may be defined as 'the search for and study of applications of the computer in language teaching and learning'." 6

In the present study the researcher developed Computer Assisted Language Learning (CALL) Package. Computer Assisted English Language Learning is a method of learning English language in which computer itself facilitate learning by the students. Computer Assisted Language Learning Package offers opportunities to students for self-learning, while the teacher is to be involved in planning and helping to carry out learning activities.

2.3 History Of Call

Computers have been used for language learning since the 1960s. This 30 + year history can be roughly divided into three main stages: behavioristic CALL, communicative CALL, and integrative CALL. Each stage corresponds to a certain level of technology as well as a certain pedagogical approach. Behaviorist CALL, conceived in the 1950s and implemented in the 1960s and 1970s, could be considered a sub-component of the broader field of Computer Assisted Instruction. Informed by the behaviorist learning model, this mode of CALL featured repetitive language drills, referred to as drill-and-practice.

The next stage, communicative CALL, emerged in the late 1970s and early 1980s, when new personal computers were creating greater possibilities for individual work. CALL software developed in this period included text reconstruction programmes.
In addition to computer as tutor, another CALL model used for communicative activities involves the computer as stimulus.  

By the late 1980s and early 1990s, critics pointed out that the computer was still being used in an ad-hoc and disconnected fashion and thus finds itself making a greater contribution to marginal rather than central elements of the language learning process. Task-based, project based, and content-based approaches all sought to integrate learners in authentic environments, and also to integrate the various skills of language learning. This led to a new perspective on technology and language learning, which has been termed integrative CALL. Thus, integrative CALL is a perspective that seeks both to integrate various skills (e.g., listening, speaking, reading, and writing) and also integrate technology more fully into the language learning process. About Integrative CALL Bax comments “This concept is relevant to any kind of technological innovation and refers to the stage when the technology becomes invisible, embedded in everyday practice and hence 'normalised'. To take some commonplace examples, a wristwatch, a pen, shoes, writing - these are all technologies which have become normalized to the extent that we hardly even recognize them as technologies.”

Discussing about the importance of the ‘CALL’ Warschauer (1999) said that we have no ‘BALL’ (Book Assisted Language Learning), no ‘PALL’ (Pen Assisted Language Learning), and no ‘LALL’ (Library Assisted Language Learning) when we have ‘CALL’. Thus, computers will have taken their place as a natural and powerful part of the language learning process.

Using computers in language learning is not a very new phenomenon. It dates back to the early 1960s, although it was confined in those days mainly to universities with prestigious computer science departments.

**Psychological Basis**

Principles of learning and theories of learning in psychology have been studied by the researcher. Major principles of learning which relate the development of both the packages and implementation of the experiment are given here in brief:
A. Principles emphasized within S-R theory

1. The learner should be active, rather than a passive listener or viewer. The S-R theory emphasizes the significance of the learner’s responses, and “learning by doing”.

2. Frequency of repetition is important in acquiring skill, and in bringing enough over learning to guarantee retention. One does not learn to type, or to play the piano, or to speak a foreign language, without some repetitive practice.

3. Reinforcement is important; that is, repetition should be under arrangements in which desirable or correct responses are rewarded. It is generally found that positive reinforcements (rewards, successes) are to be preferred to negative reinforcements (punishments, failures).

4. Conflicts and frustrations arise inevitably in the process of learning difficult discriminations and in social situations in which irrelevant motives may be aroused. Hence these have to be recognized and their resolution or accommodation provided for.

B. Principles emphasized within behaviourist theory

1. Immediate reinforcement: Small and easy doses of material make it possible for students to frequently confirm to themselves that their answers are correct and to frequently experience their successes. Skinner believes that this not only forces correct answers but also creates one’s readiness to proceed further. In this way the requirements of the law of readiness are carried out.

2. Emitted behaviour: The requirement that all responses be written (“constructed”) also follows logically from the behaviourist view of the learning process. In this connection N.A. Crowder writes: “The students response is ordinarily a ‘constructed’ response, as it was early believed by the linear theorists that ‘thinking’ a response could not properly be called ‘behaviour’.”

3. Gradual progression to complex repertoires: The complex behaviour that is to be obtained at the end of the learning process cannot develop in a final form immediately and must therefore be developed in steps, by individual elements.
4. Whether a student carries out a problem correctly or not he is expected to move to the next frame. Thus, a correction of the programme is not envisaged.

5. B.F. Skinner attaches primary importance to the law of effect i.e. the principle of effect from Thorndike’s theory of learning. Behaviourists define reinforces depending on their effects: any stimulus is a reinforce if it increases the probability of a response. The stimuli that happen to act as reinforces are divided into positive and negative. A positive reinforce is a stimulus which, when applied following an operant response, strengthens the probability of that response. A negative reinforce is a stimulus which, when removed following an operant response, strengthens the probability of that response.

C. **Principles emphasized within cognitive theory**

1. The perceptual features according to which the problem is displayed to the learner are important conditions of learning (Directional signs, “what-leads-to-what,” organic interrelatedness). Hence a learning problem should be so structured and presented that the essential features are open to the Inspection of the learner.

2. The organization of knowledge should be an essential concern of the teacher or educational planner. Thus the direction from simple to complex is not from arbitrary, meaningless parts to meaningful wholes, but instead from simplified wholes to more complex wholes.

3. Learning with understanding is more permanent and more transferable than rote learning or learning by formula.

4. Cognitive feedback confirms correct knowledge and corrects faulty learning. The notion is that the learner tries something provisionally and then accepts or rejects what he does on the basis of its consequences. This is of course the cognitive equivalent of reinforcement in S-R theory but cognitive theory tends to place more emphasis upon a kind of hypothesis-testing through feedback.

5. Goal-setting by the learner is important as motivation for learning and his successes and failures are determiners of how he sets future goals.
D. Principles from motivation and personality theory

1. The learner’s abilities are important, and provisions have to be made slower and more rapid learners, as well as for those with specialized abilities.
2. Learning is culturally relative, and both the wider culture and the subculture to which the learner belongs may affect his learning.
3. The same objective situation may tap appropriate motives for one learner and not for another, as for example, in the contrast between those motivated by affiliation and those motivated by achievement.
4. The group atmosphere of learning (competition vs. cooperation authoritarianism vs. democracy, individual isolation vs. group identification) will affect satisfaction in learning as well as the products of learning.

E. Principles of Drive-reinforcement theory

1. Drive: The student must want something.
2. Cue: The student must notice something.
3. Response: The student must do something.
4. Reward: The students must get something he wants.

Empirical Basis

For the empirical basis the researcher referred former researches. These previous researches have been studied from: (1) M.Ed. and Ph.D. studies, (2) Research work in the Fifth Survey of Educational Research, (3) Research work in the Sixth Survey of Educational Research and (4) Research work from other references.

2.4 PREVIOUS STUDIES

The researcher studied the research work (M.Ed. and Ph.D. studies) related to the present study in the context of methods, measures, approaches, treatments, tools, experimental designs and findings. The different studies reviewed here are related to 1) Computers in teaching learning and 2) English language.
Study 1:

**Topic:** Preparation and try-out of programme learning of selected topic of std-IX in English grammar.


**Objectives:**
1. To Prepare and try-out branching programme in ‘Active – Passive Voice’ for the Students of Std.-IX.
2. To compare the achievement of the students learning through conventional method and the branching programme material in active-passive voice.
3. To study the achievement of 90 students who have studied through conventional method and branching programme Material controlling IQ of the students.

**Procedure:** The study was conducted on ninety students of class-IX. The students of experimental and controlled group were given IQ test and pre-test. There after the experimental group was given the branching programme and the controlled group was taught through the conventional method. Then both the groups were given posttest. The significance of the difference between the achievements on the criterion test was investigated through ANCOVA.

**Findings:**
1. The Branching programme was found more effective than the conventional method in producing learning effect as measured in terms of gained scores.
2. The branching programme was found to be superior to the conventional method so far as comprehension and application of knowledge was concerned.
3. The branching programme took less time than the conventional method.

Study 2:

**Topic:** Effectiveness of Computer-Aided Learning (CAL) Programme As Self-study Technique.

**Researcher:** L.H.Karia, Ph.D. (Edu.), Saurashtra University, 2001.
Objectives: (1) To develop Programmed learning material and computer aided learning programme for the unit ‘Set Theory’ (Gujarati) in mathematics of standard VIII. (2) To develop lesson planning for the unit ‘Set Theory’ (Gujarati) in mathematics of standard VIII for conventional method of instruction (3) To study the effectiveness of Computer Aided Learning (CAL) programme with relation to programmed learning and traditional teaching.

Procedure: The experiment was implemented under ‘Three groups randomized subjects only posttest designs’. Students studying in standard VIII Gujarati medium of Rajkot city were taken from two schools to serve as the sample for experiment and replication of the study. 64 boy students of Shri Mahatma Gandhi Vidhyalaya were taken for experiment and 44 girl students of Gyandip Vidhyalay were taken for the replication. The teacher made posttest was administered to collect the data. The data were analyzed with the analysis of covariance.

Findings: (1) Traditional method of teaching and Computer Aided Learning programme were equally effective for boys. (2) For girls traditional method of teaching proved more effective than CAL programme. (3) Programmed learning material and CAL programme were equally effective for both the boys and girls.

Study 3:

Topic: Development and Effectiveness of Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Pressure’ (Gujarati) in Science of Standard VIII. 14


Objectives: (1) To develop a Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Pressure’ (Gujarati) in Science of Standard VIII. (2) To try-out the effectiveness of the package in the context of the academic achievement of the students. (3) To study students’ reactions towards learning through the package.
**Procedure:** The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. Total 61 students from standard VIIIth were selected randomly form a purposively selected school namely Shri Kadvibai Kanya Vinay Mandir. The experiment and replication both were carried out. The data for analysis were collected by teacher made unit test and opinionnaire. Mann-Whitney U-test and Chi-square technique of statistics were used for analysis.

**Findings:** (1) There was no significant difference between the scores of subjects of two groups. So, both CAI programme and traditional method of teaching were equally effective with reference to the achievement of the students. (2) The students expressed favourable opinions towards CAI programme.

**Study 4:**

**Topic:** Development and Effectiveness of Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Flower and Fruit’ (Gujarati) in Science of Standard VII. 15


**Objectives:** (1) To develop a Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Flower and Fruit’ (Gujarati) in Science of Standard VII. (2) To try-out the effectiveness of the package in the context of the academic achievement of the students. (3) To study students’ reactions towards learning through the package.

**Procedure:** The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. The experiment and replication both were carried out. The teacher made test and the opinionnaire were used as tools. The scores obtained in the posttest were analyzed by Mann-Whitney U-test and the opinions were analyzed by Chi-square technique.
**Findings:** (1) The Computer Aided Instruction (CAI) Programme was more effective than traditional method of teaching. (2) Students showed favourable attitude towards CAI Programme.

**Study 5:**

**Topic:** Development and Effectiveness of Multimedia Package for Science Subject of Standard 9.16

**Researcher:** H.R. Bhutak, Ph.D., Saurashtra University, 2004.

**Objectives:** (1) To develop a Multimedia Package for subject science of standard IX. The Multi-media Package was in three parts, (1) Learning by PowerPoint Slide Show, (2) Self study material and (3) Learning by transparencies through Over Head Projector. (2) To study the effectiveness of Multimedia Package with reference to achievement test in science and retention of the material of science.

**Procedure:** The research was designed on ‘Two groups randomized subjects only posttest design.’ He compared the experimental group with control group. The experimental group was given the treatment through Multimedia Package and the control group studied through lecture method. He employed posttest and an opinionnaire as tools. Mean, S.D. and t-value were obtained for the analysis of the data. With the technique of analysis of variance in scores it was tested that which medium was more effective. To examine the validity of the statements in opinionnaire Chi-square value technique was used.

**Findings:** (1) Multimedia package was more effective in terms of achievement and retention of science for both the groups of girls and the boys separately and jointly. (2) Self-study material was more effective than slide show for girls, while slide show proved more effective than self-study material for boys. (3) Slide show and self-study material were almost equally effective for girls and boys jointly.
Study 6:

**Topic:** Development and Effectiveness of Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Micro Organisms’ in Science & Technology of Standard VIII. 17

**Researcher:** M.Y.Vyas, M.Ed., Saurashtra University, 2005.

**Objectives:**
1. To develop a Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Micro Organisms’ (Gujarati) in Science & Technology of Standard VIII.
2. To try-out the effectiveness of the package in the context of the academic achievement of the students.
3. To study students’ reactions towards learning through the package.

**Procedure:** The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. One Division form standard VIII of Shri Virani Vividhlaxi Vidhyalya was selected and divided into two groups randomly. The experiment and replication both were carried out. The data for analysis were collected by teacher made unit test and opinionnaire. T-test and Chi-square technique of statistics were used for analysis.

**Findings:**
1. There was no significant difference between the scores of subjects of two groups. So, both CAI programme and traditional method of teaching were equally effective with reference to the achievement of the students.
2. The students expressed favourable opinions towards CAI programme.

Study 7:

**Topic:** Development and Try-out of Computer Aided Language Learning (CALL) Package for Teaching of Action Verbs in English Language. 18

**Researcher:** I.M.Badiyani, M.Ed., Saurashtra University, 2005.

**Objectives:**
1. To develop a Computer Aided Language Learning (CALL) Package to teach action verbs in English language.
2. To try-out the CALL package as compared to the conventional method of instruction.
(3) To compare the relative effectiveness of the CALL package and the conventional method in terms of scores obtained by students on the teacher’s made achievement test. (4) To compare the level of attainment of a group of students that has not received any treatment with the students of CALL package group. (5) To study students’ reactions towards learning through CALL package.

Procedure: The present research was of experimental type. The research design was ‘Three groups randomized subjects only posttest design’. The sample selected was two schools of Rajkot city of which one was selected for experiment and the other was for replication. During the experiment three groups of twenty-nine students each and during the replication three groups of twenty-eight students each were formed from grade VIII. One of these groups was treated as experimental group (CALL Package group) and the remaining two were treated as control group I (Conventional instruction group) and control group II (No instruction group).

A teacher made achievement test was prepared and administered as posttest on all the three groups after the treatment phase. An opinionnaire was used to study the reactions of the students towards the CALL Package.

The data obtained was analyzed using one way ANOVA, Tuckey test and Chi-square techniques of statistics.

Findings: (1) The CALL Package proved to be more effective in terms of the achievement scores of the students of grade VIII for learning ‘Action Verbs’ of English grammar. (2) The students who received instruction through the CALL Package scored significantly higher than the students who received conventional instruction and no instruction at all. (3) Students’ opinions were favourable regarding the use of the CALL Package.
Study 8:

**Topic:** Effectiveness of games, work-card and self instructional material on English language learning.

**Researcher:** M.D.Acharya, Ph.D. (Edu.), Saurashtra University, 2005.

**Objectives:** (1) To compare the effectiveness of games, work card and self instructional material to ELT in terms of students’ achievement in English. (2) To study the opinions of the students for games, work card and self instructional to ELT with reference to their learning experiences.

**Procedure:** The sample of study was of 146 students studying in std. IX of Gujarati Medium School: Adarsh High School, Kadi. Six teacher made tests for six units were prepared and reliability and validity were obtained. To know the students reactions at the end of the experiment an opinionnaire was also constructed as a tool. The counter experimental design was used for the present study. T-test, F-test and chi-square technique were used for analyzing the data.

**Findings:** (1) There was no significant variation among the achievement of the students of the three groups studied through games, work card and self-learning material but the replication showed that the games approach proved more effective than work card and self instructional material. This result also favors the replication of the experiment in terms of experimenters’ training. (2) The students’ opinion for the characteristics of the games, work card and self-learning approach showed that students favoured the learning experiences provided during the teaching through the games approach to ELT. (3) The students also liked work cards and self-instruction at material approaches for ELT.
**Study 9:**

**Topic:** Development and Effectiveness of Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Animal Classification’ (Gujarati) in Science & Technology of Standard IX.\(^{20}\)


**Objectives:** (1) To develop a Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Animal Classification (Gujarati) in Science & Technology of Standard IX. (2) To try-out the effectiveness of the package in the context of the academic achievement of the students. (3) To study students’ reactions towards learning through the package.

**Procedure:** The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. Shri Kadvibai Virani Kanya Vidhyalya was selected purposively as sample. The data for analysis were collected by teacher made unit test and opinionnaire. T-test and Chi-square technique of statistics were used for analysis.

**Findings:** (1) Computer Aided Instruction programme was more effective than traditional method for learning the unit ‘Animal Classification’ of the subject Science and Technology in standard IX. (2) Students studying through Computer Aided Instruction scored significantly higher than students studying through traditional method of learning. (3) Teaching of the unit ‘Animal Classification’ by CAI Programme was more effective than that of traditional method. (4) The students opined that they would like to learn other subjects through CAI programme and their concentration was improved while learning through CAI programme.
Study 10:

**Topic:** Development and Effectiveness of Computer Aided Instruction (CAI) Programme for Teaching the complex Unit ‘Acid, Base and Salt (Gujarati) in Science & Technology of Standard VII at Primary Level.


**Objectives:**
1. To develop a Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Acid, Base and Salt (Gujarati) in Science & Technology of Standard VII.
2. To try-out the effectiveness of the package in the context of the academic achievement of the students.
3. To study students’ reactions towards learning through the package.

**Procedure:** The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. For sample Shri Mahatma Gandhi Primary School was selected purposively. The data for analysis were collected by teacher made unit test and opinionnaire. ANCOVA technique and Chi Square test of statistics were used for analysis.

**Findings:**
1. The Computer Aided Instruction (CAI) Programme for Teaching the Unit ‘Acid, Base and Salt (Gujarati) in Science & Technology of Standard VII and Traditional method of teaching were equally effective with reference to the students’ achievement.
2. Students favoured learning through CAI programme.

Study 11:

**Topic:** Effectiveness work-card and programmed learning as a self learning techniques with reference to teaching of English grammar.

**Researcher:** R.B. Sakhiya, Ph.D. (Edu.), Saurashtra University, 2006.

**Objectives:**
1. To prepare the work card material and programmed learning material on the three units of English grammar like Active and Passive Voice, Tenses and Clauses.
2. To prepare the teacher made test as a research
tool. (3) To study the effectiveness of the work card material and the programmed learning material on English grammar with reference to achievement level and sex of the students.

Procedure: The students of the IX standard of Gujarati medium schools of Rajkot city were considered as the population for the present study. The total sample of 294 students of standard IX was selected purposely from the two schools. A sample of 144 boys from Virani High School and 150 girls from K. J. Kotecha girl’s high school was selected in the present study.

The researcher had constructed three unit test of English grammar and used to measure English grammar achievement. Using experimental research method carried out the present study. T-test and other relevant statistical techniques were use for analysis of the data.

Findings: (1) In teaching of English grammar, the work card material was more effective than the programmed learning method the lecture method for the boys having high achievement level and low achievement level in English. (2) The programmed learning method was more effective then the lecture method for the boys having high achievement level in English. Where as the programmed learning method and the lecture method were found equally effective for the boys having low achievement level in English. (3) Identical results were found for the girls having high achievement level and low achievement level.

Study 12:


Objectives: (1) To construct programmed learning for the students of std-IX on the topic of ‘Direct-Indirect Speech’ in English grammar. (2) To construct
computer assisted learning for the students of std- IX on the topic of ‘Direct-Indirect Speech’ in English grammar. (3) To tryout programmed learning for the students of std- IX on the topic of ‘Direct-Indirect Speech’ in English grammar. (4) To tryout computer assisted learning for the students of std- IX on the topic of ‘Direct-indirect Speech’ in English grammar. (5) To compare learning by programmed learning and computer assisted learning and conventional method.

**Procedure:** Researcher had selected three schools purposively of Mehsana district and students of those schools were selected via cluster sampling method. Total 270 students of IX standard was taken as the sample of the study. Desai Verbal - non verbal Group Intelligence test and teacher made test were administered as tools. The design was ‘randomized group only posttest deign’. The one way analysis of variance (ANOVA) was used for data analysis.

**Findings:** (1) The result shows that the Conventional method was more effective than the computer Assisted Learning for the topic of ‘direct- indirect speech’ of std. – IX. (2) It is also resulted that computer Assisted Learning was more effective than the programmed learning for the topic of ‘direct- indirect speech’ of std. – IX.

**Study 13:**

**Topic:** Development and Try-out of Computer Based Multimedia Package for Instruction in Gujarati Language.


**Objectives:** (1) To develop a Computer Aided Multimedia Package for teaching a unit ‘Light: Reflection and Refraction’ of the subject Science and Technology for standard 10th in secondary school in Gujarati Language. (2) To try-out the effectiveness of the package in the context of the academic achievement of the students. (3) To study students’ reactions towards learning through the package.
**Procedure:** The present research was of experimental type. The experiment was conducted by ‘Two groups randomized subjects only posttest design’. 102 girls were selected as sample for the experiment and 80 boys were selected as sample for the replication of the experiment. A teacher made unit test was administered as posttest. The scores obtained on the test were analyzed by t-test. Students’ reactions were obtained on opinionnaire developed by Ambasana (2002) and analyzed employing Chi-square technique.

**Findings:** (1) The students of Computer Aided Multimedia Package group scored significantly higher on posttest than the students of traditional method group. (2) Students opined favourably for learning through Computer Aided Multimedia Package.

**Study 14:**

**Topic:** Development and Effectiveness of Computer Assisted Instruction Programme for Teaching of Adjective in English Language. 25


**Objectives:** (1) To develop a Computer Assisted Instruction package to teach Adjective of English Grammar. (2) To test the effectiveness of the Computer Assisted Instruction Package in terms of achievement scores obtained by the students on the teacher made achievement test. (3) To study students’ reactions towards learning through Computer Assisted Instruction package.

**Procedure:** The experiment was conducted by ‘Two equal groups only post –test design.’ 46 students were selected as sample for the experiment and 48 students of grade IX were selected as sample for the replication of the experiment. A teacher made unit test was administered as posttest. The scores obtained on the test were analyzed by t-test. Students’ reactions were obtained on opinionnaire developed by Ambasana (2002) and analyzed employing Chi-square technique.
Findings: (1) The CAI Package developed to teach Adjective in English grammar to the students of grade IX was effective with respect to the students’ academic achievement. (2) The students responded favourably towards learning through CIA Package.

Study 15:

Topic: Development and Comparison of the Effectiveness of Computer Assisted English Language Learning Package and Computer Aided English Language Learning Package


Objectives: (1) To develop a Computer Aided English Language Learning (CAiLL) Package to teach action verbs in English language. (2) To develop a Computer Assisted English Language Learning (CAsLL) Package to teach action verbs in English language. (3) To try-out the Computer Aided English Language Learning Package as compared to the Computer Assisted English Language Learning Package. (4) To compare the relative effectiveness of the Computer Aided English Language Learning Package and the Computer Assisted English Language Learning Package in terms of scores obtained by students on the teacher’s made achievement test. (5) To compare the level of attainment of a group of students that has not received any instruction with the students of Computer Aided English Language Learning (CAiLL) Package group and Computer Assisted (CAsLL) English Language Learning Package group. (6) To study students’ reactions towards learning through the Computer Aided English Language Learning Package and the Computer Assisted English Language Learning Package.

Procedure: The population of the study comprised of computer acquainted students studying in standard VIII of Gujarati medium schools of Gujarat State. Total 282 students of grade VIII from four schools were selected as sample. The research was of experimental type. The research design was ‘Three equivalent groups only posttest design’. Three groups were experimental group I
(CAiLL Package group), experimental group II (CAsLL Package group) and control group (No instruction group). The groups were made equivalent by the students’ previous achievement in English and their teachers’ rating. An achievement test of fifty marks was constructed by the researcher on the basis of the objectives, analysis of the content and the blue-print. In order to measure the opinions of the students towards the CAiLL Package and the CAsLL Package, the opinionnaire developed by Ambasana (2002) was adapted. The data obtained were analyzed using one way ANOVA, Tuckey test and Chi-square techniques of statistics.

**Findings:** (1) CAiLL Package and the CAsLL Package each was found effective in raising students’ achievement in unit ‘Action Verbs’ of English grammar. (2) Compared both the Packages with each other the CAsLL Package proved to be more effective than the CAiLL Package in terms of the achievement scores of the students of grade VIII for learning ‘Action Verbs’ of English grammar. (3) The CAiLL Package and the CAsLL Package were also effective in evoking positive reactions towards the use of them in learning English grammar especially ‘Action Verbs’.

**Study 16:**

**Topic:** Development And Implementation Of Computer Aided Instruction Programme For Instruction in Geometry

**Researcher:** Mrs. Kalpana Kundu, Ph.D.(Edu.), Saurashtra University, 2008.

**Objectives:** (1) To develop a computer aided instruction programme for instructions in geometry. (2) To check the effectiveness of computer aided instruction programme with compared to traditional method. (3) To know the reactions of the students regarding the computer aided instruction programme.

**Procedure:** As the study being experimental in nature some requirements were to be met, so the school, G.T. Sheth High School, Rajkot was selected purposely. A total of 54 Students (30 Boys and 24 Girls) from two sections of
Standard X (English Medium) were selected. Since experiment and replication were to be conducted, in each stage two groups were to be formed. Thus, four groups were formed by randomization on-the basis of their previous achievement. Out of those two groups, one group was treated as experimental group, received treatment through CAI for certain period of time while the other group was treated as Control group (No instruction group) which was a traditionally classroom taught group.

To measure the independent variable after the treatment phase a unit test was constructed by the researcher. For study the reactions of the students towards CAI Package, an 'Opinionnaire’ developed by Ambasana (2002) was used. To check the difference between group means of achievement scores t-test was performed. Opinions towards learning through CAI package were collected as frequencies on nominal scale and the sample was not randomized, thus, nonparametric chi-square technique was used to analyze the data. Microsoft’s Excel and SPSS for windows were used for qualitative data analysis.

**Findings:** (1) To examine the effectiveness of Computer in teaching geometry, the CAI Package was developed to teach Triangle portion of mathematics to the students of Class X. It was proved effective in terms of the students' academic achievement. (2) The students responded positively towards learning through CAI Package.

**Study 17:**

**Topic:** Development and Effectiveness of Computer Assisted Instruction (CAI) Programme For Instruction in Geometry at Primary Level

**Researcher:** Sanjay N. Maheta, Ph. D. (Edu.), Saurashtra University, 2009.

**Objectives:** (1) To develop a Computer Assisted Instruction (CAI) Programme for Teaching the Units ‘Basic concept of Geometry’ and ‘Circle’ (Gujarati) in Maths of Standard V. (2) To develop a Computer Assisted Instruction (CAI) Programme for Teaching the Unit ‘Triangle: Congruity of
triangle’ (Gujarati) in Maths of Standard VI. (3) To develop a Computer Assisted Instruction (CAI) Programme for Teaching the Units ‘Quadrilateral’ and ‘Kinds of quadrilateral’ (Gujarati) in Maths of Standard VII. (4) To try-out the effectiveness of the package in the context of the academic achievement of the students. (5) To study students’ reactions towards learning through the package.

Procedure: The present research was of experimental type. The design was ‘Two groups randomized subjects only posttest design’. 288 students of two divisions out of three form standard V, VI and VII of Shri Mahatma Gandhi Education Campus was selected and divided into two groups randomly. The experiment and replication both were carried out. The data for analysis were collected by teacher made unit test and opinionnaire. T-test and Chi-square technique of statistics were used for analysis.

Findings: (1) The Computer Assisted Instruction (CAI) Programme for Teaching the Units ‘Basic concept of Geometry’ and ‘Circle’ (Gujarati) in Maths of Standard V group did not score significantly higher on posttest than the students of traditional method group. (2) The Computer Assisted Instruction (CAI) Programme for Teaching the Unit ‘Triangle: Equilateral of triangle’ (Gujarati) in Maths of Standard VI group scored significantly higher on posttest than the students of traditional method group. (3) The Computer Assisted Instruction (CAI) Programme for Teaching the Units ‘Quadrilateral’ and ‘Kinds of quadrilateral’ (Gujarati) in Maths of Standard VII group scored significantly higher on posttest than the students of traditional method group. (4) Students opined favourably for learning through Computer Assisted Multimedia Package.
In the Sixth Survey of Educational Research the following research works were cited.

**Study 18:**

**Topic:** Development of Computer-Assisted English Language Teaching for VIII Standard Students


**Objectives:** (1) To develop a computer assisted English language teaching program for standard VIII Gujarati medium students. (2) To study the effectiveness of the computer assisted English language teaching program on students’ achievement in terms of Vocabulary, Grammar and Comprehension by taking pretest and IQ as covariates. (3) To study the effectiveness of the computer assisted English language teaching program in terms of students’ achievement of all above mentioned with respect to their intelligence, motivation and attitude.

**Procedure:** Students studying in standard VIII Gujarati medium were taken from two schools to serve as the sample for the study. Students of one school i.e. Rosary school, Baroda formed the experimental group and students of the other school i.e. GEB School, Baroda formed the control group. The experimental group consisted of 66 students and control group consisted of 46 students. The tools used in the pilot study were also used in the final experiment, namely, Pretest, Raven’s progressive matrices, Junior Index of motivation by Frimer translated into Gujarati by Desai and the posttest developed by the investigator. For studying the attitude of the students towards the package, the researcher developed and administered an attitude scale on the experimental group only after the final experiment. To fulfill the first objective of the pilot study, the investigator conducted informal interviews with the students by asking them about the difficulties they faced. ANCOVA was applied for analyzing the data.
Findings: (1) When the computer is used to its full potential, it can create an atmosphere where the students can learn and interact with the computer without being afraid of the teacher’s presence. (2) The computerized exercises can help the student become familiar with significant amount of vocabulary, grammar and comprehension because it provides effective individualized instruction.

Study 19:

Topic: Development of Software for Computer Aided Instruction and its Comparison with Traditional Method for Teaching Physics at Plus II level


Objectives: (1) To develop computer software for computer aided instruction for teaching selected topics in physics, namely, ‘semiconductors’, ‘P-N Junctions’ and ‘Electro-Magnetic Induction’. (2) To study the effectiveness of CAI material in terms of achievement and reaction towards CAI material. (3) To compare the achievement of (a) class XII students taught through CAI with those taught through traditional method, (b) class XII students with those of class XI students both taught through CAI, and (c) male students with female students of class XI taught through CAI by considering intelligence, pretest, attitude towards science, adjustment, personality and study habits separately as covariates. (4) To compare the reaction towards CAI material (a) of class XII students with those of class XI students both taught through CAI, (b) of male students with those female students of XI both taught through CAI, and (c) of male students with those of female students of class XII both taught through CAI by considering intelligence, achievement, attitude towards science, adjustment, personality and study habits separately as covariates. (5) To study the effect of treatment, adjustment with its various dimension and interaction on achievement separately. (6) To study the effect of treatment, attitude towards science and their interaction on achievement. (7) To study the effect of treatment, study habits and their interaction on achievement.
Procedure: The present study was experimental and pretest-posttest control group design was used. The two groups were equated with respect to intelligence. Sex, pretest, attitude towards science, adjustment and personality were the moderate variables. Sample comprised 203 students of class XI and XII of Indore city school where CBSE syllabus is being followed. The tools used for measuring variables were: Study Habits Inventory by M. Mukhopadhyay and D.N. Sansanwal, Science Attitude Scale by Avinash Grewal, Maudsley Personality Inventory by S.S. Jalota and S.D. Kapoor, Adjustment Inventory by A.K.P. Singh and R.P. Singh, Standard Progressive Matrices by J.C. Raven, and criterion test on selected topics of physics and Reaction Scale for assessing Reaction towards CAI material were developed by investigator. Data analyses were performed with the help of percentile, mean, correlated t-test, coefficient of variance, chi-square test, ANOVA and ANCOVA.

Findings: (1) The CAI material was found to be effective in terms of achievement and reaction towards CAI material of both class XI and XII students. (2) The CAI was found to be significantly superior to traditional method in terms of achievement of class XII students when moderate variables were considered as covariates separately. (3) The class XII students achieved significantly higher than class XI students both taught through CAI when moderate variables were taken as covariates separately. (4) CAI was found to be equally beneficial to both males and females of class XI in terms of achievement when moderate variables were considered as covariates separately. (5) CAI was found to be equally beneficial to both males and females of class XII in terms of achievement when moderate variables were considered as covariates separately. (6) Class XI students were found to be have significantly more favorable reaction towards CAI material than class XII students when moderate variables were considered as covariates separately. (7) Class XI and class XII males as well as females were found to have equally favorable reaction towards CAI material when moderate variables were considered as covariates separately. (8) The CAI was found to be significantly superior to traditional method in terms of achievement of students. (9) The achievement was found to be independent of personality as well as interaction between treatment and personality. (10) The achievement was found to be independent of personality, adjustment, emotional
adjustment, social adjustment, educational adjustment, attitude towards science, and their interaction with treatment separately. The CAI was found to benefit both students with poor as well as good educational adjustment. (11) The study habits as well as interaction between treatment and study habits were not found to influence significantly the achievement of students.

**Study 20:**

**Topic:** A comparative study of the Effectiveness of Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI) on Pupil’s Achievement in Science, their Self-Concept and Study Involvement

**Researcher:** Vij, Sanjana, Ph.D. (Edu.), M.S.University, 2003.

**Objectives:** (1) To design and develop instructional plan for Teaching selected unit in Science amongst the prescribed course of study at class VII stage based on Computer Aided Instructions (CAI) & Computer Managed Instructions (CMI). (2) To construct and standardize Achievement test in selected units of Science for class VII. (3) To study individual Effectiveness of CAI on Self-concept; study involvement; and Academic Achievement. (4) To study individual effectiveness of CMI on Self-concept; study involvement; and Academic Achievement. (5) To compare the effectiveness of CAI and CMI instructions on Self-concept of students. (6) To compare the effectiveness of CAI and CMI instructions on study involvement of students. (7) To compare the effectiveness of CAI and CMI instructions on Academic Achievement of students.

**Procedure:** The present study was conducted on a sample of 90 Pupils studying in three sections of the Class VII of Evergreen Public School, New Delhi. From each section 30 students were selected purposively. Two sections formed the two Experimental Groups (E1 and E2) and one section formed the Control Group (C). The following tools were used: (1) Socioeconomic Status Scale developed by Kulshreshtha; (2) Raven’s Progressive Metrices developed by Raven; (3) Self-Concept Questionnaire (SCQ) a test of Self-concept developed
by Sherry and Verma; (4) Study Involvement Inventory developed by Asha Bhatnagar; and (5) Science Achievement Test developed by investigator. The data were analysed with the help of t-test.

**Findings:** (1) At the end of the experiment, it was found that the group of Pupils taught Science through Computer Assisted Instructions was effective in raising the Self-concept of the Pupils. (2) The posttest mean scores of the Pupils taught Science through Computer Assisted Instructions increased significantly which indicates that Computer Assisted Instructions enhanced study involvement of the Pupils. (3) The group of Pupils taught Science through Computer Assisted Instructions showed significantly higher posttest mean score on Achievement in Science in comparison to pre-test mean Achievement score. (4) At the completion of experiment, it was found that the group of Pupils taught Science through Computer Managed Instructions was effective in raising the study involvement of the Pupils. (5) The posttest mean score of the Pupils taught Science through Computer Assisted Instructions was found to be significantly higher on increasing the study involvement in comparison to pre-test score. (6) The group of Pupils taught Science through Computer Managed Instructions showed significantly higher posttest mean scores on Achievement in Science in comparison to pre-test score. (7) The group of Pupils taught Science through Computer Managed Instructions achieved significantly higher mean score on the test of Self-concept than the Pupils taught Science through Computer Assisted Instructions. (8) At the posttest mean score of the group of Pupils taught Science through Computer Managed Instructions was significantly higher on the test of Self-concept than the group of Pupils taught Science through traditional method. (9) There was no significant difference in Self-concept between the group of Pupils taught Science through Computer Assisted Instructions and the group of Pupils taught Science through traditional method. (10) The mean gain score of the group of Pupils taught Science through Computer Managed Instructions was found to be significantly higher on the test of Self-concept, than the group of Pupils taught Science through Computer Assisted Instructions. (11) The group of Pupils taught Science through Computer Managed Instructions showed significantly higher mean gain score on the test of Self-concept than the group of Pupils taught Science through traditional method. (12) There was no significant
difference between the group of Pupils taught Science through Computer Assisted Instructions and the group of Pupils taught Science through traditional method on the mean gain score of Self-concept. (13) The posttest mean score of study involvement of the group of Pupils taught Science through Computer Assisted Instructions was significantly higher than the group of Pupils taught Science through Traditional Method. (14) The group of Pupils taught Science through Computer Managed Instructions achieved higher mean score on study involvement than the group of Pupils taught Science through Traditional Method. (15) There was no significant difference in the posttest mean score of study involvement between the group of Pupils taught Science through Computer Managed Instructions and the group of Pupils taught Science through Computer Assisted Instructions. (16) The group of Pupils taught Science through Computer Assisted Instructions showed significantly higher mean gain score on study involvement than the group of Pupils taught Science through traditional method. (17) The mean gain score on study involvement of the group of Pupils taught Science through Computer Managed Instructions was found to be significantly higher than the group of Pupils taught Science through traditional method. (18) There was no significant difference in the mean gain score of study involvement between the group of Pupils taught Science through Computer Managed Instructions and the group of Pupils taught Science through Computer Assisted Instructions. (19) The posttest Achievement mean score of the group of Pupils taught Science through Computer Managed Instructions was significantly higher than the group of Pupils taught Science through Computer Assisted Instructions. (20) The group of Pupils taught Science through Computer Assisted Instructions showed significantly higher gain in mean Achievement score than the group of Pupils taught Science through traditional method. (21) Group of Pupils taught Science through Computer Managed Instructions achieved significantly higher mean score on Achievement than the group of Pupils taught Science through traditional method. (22) The mean gain score of the group of Pupils taught Science through Computer Managed Instructions was found to be significantly higher on Achievement than the group of Pupils taught Science through Computer Assisted Instructions. (23) The group of Pupils taught Science through Computer Assisted Instructions showed significantly higher mean gain score on Achievement than the group of Pupils taught Science through traditional
method. (24) The mean gain score of the group of Pupils taught Science through Computer Managed Instructions was found to be significantly higher in Achievement than the group of Pupils taught Science through traditional method.

Study 21:

**Topic:** Development of Computer Software for Learning Chemistry at Standard XI

**Researcher:** Khirwadkar, A., Ph.D. (Edu.), M.S. University, 2001.

**Objectives:** (1) To develop CAI package in subject of chemistry for standard XI science students studying GSTB syllabus. (2) To study the effectiveness of the software package in terms of instructional time and achievement of student. (3) To study the effect of the software package on students’ achievement in relation to students’ (a) intelligence level, (b) motivations level, and (c) attitude towards the package. (4) To study the attitude of the students and teachers regarding the effectiveness of the CAI package with regard to aspects of the software, such as, content of the software, presentation of the software, examples and illustrations, graphs and figures, evaluation items, utility at the software and instructions given in the instructional manual that are provided with the software.

**Procedure:** The three chapters were selected based on difficulty level. In the actual experiment, Pre-test-posttest design was followed. The sample consisted of 60 students selected randomly. Out 60 students, 30 students were in experimental group and 30 students in control group. Standard XI science students were exposed to the CAI Package developed and the different tools were administered on them from time to time. Tools constructed and implemented for the pilot study were the pre-test, posttest, unstructured interview schedule and structured interview schedule for chemistry teacher of standard XI. Data were analyzed with the help of ANOVA, ANCOVA, content analysis and percentages.
Findings: (1) The software package developed for teaching three units of standard XI chemistry textbook of GSTB was effective in terms of student’s achievement and time. (2) The experimental group took 45 hours time on an average to complete the three units. (3) The academic achievement in chemistry of students of experimental group was found to be affected by variables like IQ, academic motivation and attitudes. (4) Majority of experimental group students had positive attitude about various aspects of software package especially regarding presentation of content, logical sequencing and language used for understanding the content. The school subject teachers always held the positive attitude.

Study 22:

Topic: Development and Validation of Computer Assisted Instruction in Physics For High School Students


Objectives: (1) To develop suitable software on the selected topic “Electricity” for class IX and validate it. (2) To study the effect of computer assisted instruction on learning the concepts in the topic “Electricity” in physics. (3) To analyze the variation among the students in the acquisition of various cognitive skills by learning through computer assisted instruction. (4) To study the relationship between achievements in physics learnt through computer assisted instruction and intelligence of the students. (5) To find out the relation between students’ attitude towards science and their achievement in learning through computer assisted instruction.

Procedure: For the study Quasi – experimental design was adopted. Total 200 students of IX standard were selected from Kendriya vidyalaya, and Sri Padmavathy Ammal matriculation school. Tools used were: Computer programming on the topic “Electricity” in physics for class IX prepared by the investigator; Culture Fair Test scale 2 published by institute for personality and ability testing; Science attitude scale; Interim test (unit test) on the topic to assess the terminal behaviors of the students prepared by the investigator; Achievement
test in the topic to assess the cognitive abilities of the students prepared by the investigator. The data were analyzed with the help of the t-test and correlation technique.

**Findings:** (1) The achievement in the posttest of the experimental group is higher as compared to control group. (2) The experimental group differs significantly when compared to control group. Hence learning through computers helped in achieving better than the control group. (3) There is significant difference in the achievement of the students who learnt through computer assisted instruction that the achievement of the students learnt through traditional method. (4) The attainment of the cognitive factor “Application and skill” is lower for the students who learn through traditional method when compared to the students who learn through computer. (5) For the students’ understanding of the units nature of changes (unit 1) and electric potential (unit 2) are found to be difficult when they learn through traditional method, but it has been found that students found it easier when they learn the same concept through computer. (6) There is no significant relationship between achievements of students learning through computer assisted instruction and their intelligence. (7) There is no significant difference between the attitude towards science that learns through computer assisted instruction and through traditional method.

**Study 23:**

Pandya and Chaudhary (2000)\(^\text{35}\) studied the effect of Computer Assisted Learning (CAL) in achieving higher cognitive skills. The study was carried out to determine the degree of attainment of cognitive skills through Computer Assisted Learning (CAL) compared to traditional approach to teaching and to compare the effect of CAL on the learning achievement of boys and girls. The content selected were lessons of physics. For this study, ‘Pre-test posttest matched group experimental design’ was chosen. An achievement test was constructed as a tool for collection of the data. By employing t-test and F-test and Chi-square technique the data were analyzed. The results signals towards the effectiveness of the CAL approach over the traditional one. Male students were found to be superior to female ones in learning physics.
Study 24:

Ranade (2004) developed a computer Assisted instructional (CAI) Package on ‘Multiple Intelligences’ for teacher educators and studied its effectiveness in terms of achievement. The incidental sample consisted of 25 teacher educators from both rural and urban regions of Maharashtra, Goa and Tamilnadu. ‘Pre-test posttest single group experimental design was employed to study the effectiveness. The CAI Package comprised of two phases of PowerPoint Presentation namely 1) For learning the content 2) For evaluating the content. The efficacy of the package in terms of achievement the ‘t’ test, indicated that there is a significant increase in achievement in the posttest than in pre-test. She also analyzed the critical comments obtained from participants viewing the presentation and studied the reactions of participants towards future use of CAI by them. Most participants suggest that they felt much more positive about using computers for teaching-learning, after viewing this presentation. Many, who were almost totally computer-illiterate, felt motivated to learn computers after seeing their usefulness in teaching learning. Those who were already computer-literate commended that they learnt a lot of new techniques that they would use in their own presentations. The findings, both quantitative and qualitative, reveal that the presentation was effective in bringing about learning. It was also effective in evoking positive reactions towards use of CAI in teaching learning.

2.5 Critical Review

With reference to the present study twenty four related previous researches have been studied and reviewed. The critical extract of review is as follows:

Level. Out of the twenty four researches studied by the researcher twelve studies were undertaken at Ph.D. level, ten were undertaken at M.Ed. level and two were undertaken as projects.

Method of instruction. All the studies are related to trying out the effectiveness of different methods of instruction. Most of the researchers compared the achievement effects of various forms of computer delivered instruction as compared with the effects of traditional instruction. Eight researchers developed programmed learning, two prepared work-card, one prepared games and self learning material, one prepared multi-media package including O.H.P transparencies, slide show and self-learning instruction
One study compared Computer Assisted Instructions (CAI) with Computer Managed Instructions (CMI) and one compared the relative effectiveness of the Computer Aided English Language Learning (CAiLL) Package and the Computer Assisted English Language Learning (CAsLL) Package.

**Standard, subject, and unit.** Out of the twenty-four previous studies reviewed, fifteen preferred standards from secondary level, four from higher secondary level, while four preferred primary level and one prepared a package for teacher educators. Eleven had chosen the subject maths or science, eight English language, three physics, one chemistry and one chosen psychology for teacher educators. Almost all selected a unit from the textbooks or grammar books.

**Sample size.** Sample size of most of the studies ranged from forty-six to two hundred ninety-four.

**Experimental design.** By reviewing the research works, it is clear that in fifteen studies two groups design, in seven studies three groups design, in one single group design and in one quasi-experimental design were selected. Out of them nineteen researches employed only posttest and five employed both pre-test and posttest design.

**Tools.** In M.Ed and Ph.D researches teacher made test and opinionnaire were used as tools by almost all. While researchers cited in Sixth Survey of Educational research utilized teacher made tests as well as pre-standardized tests. While Pandya and Chaudhary (2000) and Ranade (2004) constructed an achievement test.

**Statistical techniques.** Following statistical techniques were used by the researchers reviewed: Mean, SD, ‘t’-test, ANOVA, ANCOVA, Mann-Whitney U-test and Chi-square.

**Retention of learning.** Did students receiving CAI retain their learning better? The answer, according to researchers who conducted comparative studies of retention of learning, was ‘yes’. In these researches students’ scores on delayed tests indicated that
the retention of content learned using CAI is superior to retention following traditional instruction.

**Opinions.** Most of the researchers that examined the effects of different forms of computer delivered instruction on students’ learning outcomes also gathered students’ opinions. This inquiry has brought most of the researchers to the conclusion that the use of computer delivered instruction led to favourable opinions. This general finding emerged from the studies of Dadhaniya 2004; Chhag 2004; Bhutak 2004; Vyas 2005; Badiyani 2005; Upadhyay 2006; Hirani 2007; Maheta 2007; Badiyani 2008; Kundu 2008; Maheta 2009; Prabhakar 1995; Khirwaskar 2001; Nalayini 1998 and Ranade 2004.

**Attitudes.** The study by Khirwaskar (2001) suggested that that the use of CAI led to highly favourable attitudes of students than those who did not use the computers.

**Findings.** Researches examining the effects of various forms of Computer delivered instruction showed generally positive results. Prabhakar (1995), Nalayini (1998), Zyod (1999), Pandya and Chaudhary (2000), Khirwaskar (2001), Chhag (2004), Ranade (2004), Badiyani (2005), Upadhyay (2006), Chaudhary (2007), Hirani (2007) Maheta (2007), Badiyani (2008) and Kundu (2008) found that various forms of computer delivered instruction have the potential for improving student achievement scores. The researches by Karia (2001), Dangar (2003), Dadhanaia (2004), Vyas (2005) Solanki (2006) and Maheta (2009) showed that there were no significant achievement differences between treatment and control groups. Games, work-card and self-learning material were equally effective in experiment and in replication and games approach proved more effective than work-card and self-learning material in the research of Acharya (2005) and the work-card material was more effective than the programmed learning method and the lecture method in the research of Sakiya (2006). Achievement mean scores of the group of students taught through Computer Managed Instructions was significantly higher than the group of students taught through Computer Assisted Instructions in the research of Vij (2003). In Branching programme employed by Rathod (2000) and Multimedia Package employed by Bhutak (2004) students of experimental group scored higher than the traditional instruction group. The CAsLL Package proved
to be more effective than the CAiLL Package in terms of the achievement scores of the students in the research of Badiyani (2000).

Most of the programmes of computer-delivered instruction evaluated in the past have produced positive effects on students’ learning and attitudes. While the research support is not as strong as that indicating the superiority of CDI always; the evidence nevertheless indicates that computer delivered instruction approaches as a whole generate higher achievement than conventional instruction by itself. Computer delivered instruction should be considered to be at least as effective as conventional method of teaching. Further programmes for developing and implementing computer-delivered instruction should therefore be encouraged. Diversities of the results of the reviewed researches indicate a need for further investigation in the area of computer delivered instruction. This led the present researcher to undertake the study.

2.6 **Distinguishing Features Of The Present Study**

After studying and reviewing the previous researches, the following distinguishing features were contemplated and incorporated in the present research.

Almost all the previous researchers compared various forms of computer delivered instruction with traditional method of instruction. In the present study the researcher devised Computer Assisted Language Learning and traditional teaching. The comparison between these two methods was done.

The content matter of the present research i.e. the Parts of Speech is useful for any learner of English language be a formal or informal.

The content matter (Unit) selected by previous researchers was the part of the textbooks in their respective subjects while the content matter of the present research i.e. Parts of Speech is not a part of any prescribed grammar book or textbooks. No formal treatment of the unit is given in any book.

This research has focused the field of language learning. Hence it is named as Computer Assisted Language Learning Package (CALL).

Small step learning approach is followed while presenting the content.

Colour discrimination is the peculiarly of the package.
User manual with detailed guideline for the teachers who intend to use this Package in their teaching is also prepared as a part of the research.

In the CALL Package exercise sheets are developed and given to students as a part of the Package for practice and drill. Proper feedback has been given at every correct or incorrect response of the students to make the learning more effective.

Sample taken for the experimentation was from P.T.C. college.

Two equivalent group only posttest experimental design was employed in this work.

After the treatment phase opinions and reactions (feedback) towards the CALL Package were collected and analyzed.

For analyzing the data independent t-test was used.

The details of the methodology followed in carrying out the present research are given in the following chapter.