CHAPTER TWO

REVIEW OF RELATED LITERATURE

CHAPTER - II

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2.0 INTRODUCTION

The present chapter includes the review of previous researches related to present study. The researcher has taken an attempt to carefully review the research journals, books, dissertations, thesis and other sources of information related to the problem of investigation. Through reviewing the related literature, the researcher came to know about the recommendations of the previous researchers listed in their studies for further researches. The overview of the previous researches provides the researcher with the background of the problem area. In this process, the researcher takes an advantage of the knowledge, which has been already accumulated in the past as a result of constant human endeavor in the form of researches. Review of the related literature allows the researcher to acquaint him with the current knowledge in his area of research. The review of related literature updates the researcher through providing background for understanding latest knowledge on the topic under research. Through the review of previous studies, one can have a clear perspective of the problem of the study. Repetition of studies can be avoided through this process. By reviewing the related literature, the researcher can avoid the problem areas which have already been done. Through the review of related literature, the researcher can avoid duplication of research work. The review of related literature enables the researcher to define the limits of his research study. It helps the researcher to delimit and define the problem properly. It helps the investigator with the new understanding and insight which subsequently helps him in proper planning of the study, adopting the suitable methodology, developing tools for data collection and adopting proper techniques for analysis and interpretation of data. The review of related literature gives the researcher an understanding of the research methodology which refers to the way the studies had been conducted. It helps the researcher to know and understand about the tools and instruments used in the previous studies. Through the review of related literature, the researcher will have an insight into the statistical methods through which validity of result is to be established.

2.1 REVIEW OF RELATED LITERATURE

In this chapter, the investigator has reviewed all the possible studies conducted in India and abroad in the area of use of multimedia approach and computer assisted instruction which is related to the present study. Studies were reviewed with a view to examine the research findings, methodology and the trends of research in the area of CAI and to identify the research gap if any. The investigator has presented here under the brief of reviewed studies which have relevance to the present study.

2.1.1 REVIEWED STUDIES CONDUCTED IN INDIA

Acharya (2005) studied the effectiveness of games, work-card and self-instructional material on English language learning. It was intended to compare the effectiveness of games, work card and self-instructional material in terms of students and their opinions. A total of 146 students studying in std. IX of Gujarati Medium Schools were selected as sample. The data were collected in terms of achievement score and opinions of the students by using a teacher made achievement test and an opinionnaire. Under this experimental study, the data were analyzed and interpreted by using T-test, F-test and chi-square technique. The findings showed that there was no significant variation in the achievement of the students of the three groups studied through games, work card and self-learning material but the replication of games approach proved better than that of other two approaches. Further students favoured the learning experiences provided by the games approach and students also liked work cards and self-instructional material approaches for ELT.

Babitha (2015) conducted a study on development of a self-instructional package on basic grammar in English for upper primary school pupils. It was intended to develop a Self-Instructional Package (SIP) on basic grammar in English for upper primary school pupils. It was also intended to test the efficacy of the SIP by comparing the achievements of experimental and control groups with respect to the levels of cognition namely; knowledge, understanding and application. The sample selected for the experimental study consisted of sixty pupils of seventh standard. The sample was divided into two homogeneous groups. Descriptive statistics such as mean and standard deviation have been used to describe the distribution of scores. The parametric t-test has been employed to compare the achievements of experimental and control groups. The findings showed that the experimental group exposed to the Self-Instructional

Package was significantly higher in achievement than the control group learned through conventional classroom teaching. The same results were observed in the case of boys and girls treated separately. The pupil's scores differed maximum in the case of cognitive functioning at the application level. This testified beyond doubt that the Self-Instructional package is most effective at the application level of cognition.

Badiyani (2008) conducted a study on development and comparison of the effectiveness of Computer Assisted English Language Learning (CAsLL) package and Computer Aided English Language Learning (CAiLL) package. The objective of the study was to try-out and study the comparative effectiveness of both of these packages viz. CAiLL and CAsLL respectively. The population of the study comprised of computer acquainted students studying in Std. VIII of Gujarati medium schools of Gujarat State. Total 282 students of Std. VIII from four schools were selected as sample. This was an experimental study based on 'Three equivalent groups only posttest design'. In order to measure the opinions of the students towards the CAiLL and CAsLL Packages, the opinionnaire developed by Ambasana (2002) was adapted. The data obtained were analyzed by using statistical techniques like one-way ANOVA, Tuckey test and Chi-square technique. The findings showed that both the packages were found effective in raising students' achievement in topic 'Action Verbs' in English grammar. The comparative study of both the packages showed that CAsLL Package was more effective than the CAiLL Package in terms of the achievement of the students. 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'.

Barot (2009) conducted a study on development and effectiveness of CAI in Sanskrit language for Std. IX students. He has developed CAI in Sanskrit poetry with a view to study of its effectiveness in terms of achievement of Std. IX students and their reactions about the developed CAI. Pre-test, Post-test experimental and control group design was employed for the study. Students of Std. IX of Shree Ambe Vidyalaya and Ambe Vidyalaya were constituted as the sample for the study. One of the Std. IX sections of Ambe Vidyalaya (40 students) was treated as experimental group, whereas, one section of Shree Ambe Vidyalaya was treated as control group (40 students). The data obtained were analyzed by using statistical techniques like T-test and Chi-square. Findings of the study proved that the prepared CAI in teaching of Sanskrit Poetry was

found Effective in terms of Achievement of the students as well as the reactions of the students towards the developed CAI.

Bhutak (2004) conducted a study on the development and effectiveness of multimedia package for Science subject of Std.9. The Multimedia Package was in three parts, (a) PowerPoint Slide Show, (b) Self-study material and (c) Transparencies. The research was based on 'Two groups randomized subject's only posttest' design. The experimental group was given the treatment through Multimedia Package while the control group studied through lecture method. An achievement test and an opinionnaire were employed as tools to collect the data. 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. The findings showed that 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. Self-study material was more effective than slide show for girls, while slide show proved more effective than self-study material for boys. Slide show and self-study material were almost equally effective for girls and boys.

Das (1998) conducted a study entitled exploring effectiveness of Computer Assisted Learning Materials (CALM) on rhymes in different modes. The CALM was based on rhymes in Text (T), Text Music (TM), Graphics-Text-Music (GTM) and Graphics-Text-Music-Recitation (GTMR) Modes. The effectiveness of developed CALM was studied in terms of students' ability related to word learning, Analytical understanding, comprehensive understanding, writing and recitation. The five different groups of students of Std. –II were selected with the help of systematic random sampling technique from the selected schools of Baroda city. The collected data were analyzed statistically using analysis of covariance (ANCOVA). The study revealed that composite modes of teaching may not always ensure higher learning in all areas of language. Graphics text mode was found comparatively weaker than the other modes in learning word meaning. The one of the seven rhymes text mode was found most effective in developing language ability. In three out of seven rhymes text mode largely was found comparatively weaker than other modes for comprehensive understanding, whereas in one rhymes text mode was found most effective for comprehensive understanding.

Gupta (1987) conducted a study on Computer Assisted Instruction (CAI) in chemistry under two different strategies. The CAI mainly developed to study the relative effectiveness and to know the opinion of the student towards CAI. In this study the Investigator had employed the 'Pre-test, Post-test, Experimental design'. Under incidental sampling technique, Class XI students were selected and two groups of students were formed. The students of two groups were matched with respects to their age, sex, aggregate marks and marks in Science in the current school examination. One group received instruction under strategy – I of CAI and another under strategy – II of CAI. Criterion tests were prepared by the researcher to collect the data, which were used as pre-test, post-test and retention test. Also, an opinionnaire pertaining to the opinion of students towards CAI was used. The study revealed that the girls under both the strategies scored significantly higher than the boys in terms of their mean scores and mean retention scores. Also, the students under both the strategies had highly favorable opinion in terms of percentages of favorable response towards the CAI.

Hirani (2007) developed and tried-out Computer Based Multimedia Package for instruction in Gujarati language. A Computer Aided Multimedia Package was developed for teaching a unit 'Light: Reflection and Refraction' in the subject Science and Technology for Std. 10^{th} in a Gujarati medium secondary school. The effectiveness of the package was studied in terms of the achievement of the students and their reactions towards the used package. The present study was an experimental study. 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 through an opinionnaire developed by Ambasana (2002) and analyzed employing Chi-square technique. The findings showed that the students studied through Computer Aided Multimedia Package scored significantly higher than the students studied through traditional method. Also, students were in favour of learning through Computer Aided Multimedia Package.

Jeyamani (1991) conducted a research on studying effectiveness of simulation model of teaching through Computer Assisted Instruction. The major objective was to study the effectiveness of the simulation model of teaching as compared to the traditional method. The CAI package was developed by the investigator in Physics for

class XI students. The sample for the investigation consisted students of Std. XI of two schools. The study was an experimental study based on 'pre-test post-test design.' An achievement test and an opinionnaire were employed as tools to collect the data. Mean, S.D. and T-value were obtained for the analysis of the data. The findings showed that experimental group performed better on the post-test and difference was significant with respect to sex and medium of instruction.

Karia (2001) conducted a study on effectiveness of Computer-Aided Learning (CAL) Programme as self-study technique with compared to PLM and conventional method of instruction. The instruction was based on a unit 'Set Theory' in Mathematics of std. VIII. The experiment was implemented under 'Three groups randomized subject's only post-test design'. Students studying in Std. VIII Gujarati medium schools of Rajkot city were selected from two schools as the sample for the experiment and replication of the study. 64 boys of Shri Mahatma Gandhi Vidyalaya were selected as experimental group and 44 girls of Gyandip Vidyalaya were selected for the replication. The teacher made achievement test was administered to collect the data. The data were analyzed by using ANCOVA. The findings showed that traditional method of teaching and Computer Aided Learning programme were equally effective for the boys, while traditional method of teaching proved more effective than CAL programme for girls. Programmed learning material and CAL programme were found equally effective for both boys and girls.

Khirwadkar (1998) studied the effectiveness of developed Computer Software for learning Chemistry at Std. XI. The effectiveness of CAL package was studied with reference to students' achievement, student' intelligence level, motivational level, students' attitude and teachers' attitude. The three chapters were selected based on difficulty level. The study was based on 'Pre-test, Post-test, Experimental design'. The data were quantitative as well as qualitative including teachers and students' opinion about the package. The data analysis was done by ANOVA, ANCOVA and content analysis. Investigator had collected data of students' and teachers' attitude towards package through structured and unstructured interview schedule. Findings of the study showed that the CAI package was found effective in terms of academic achievement of the students and instructional time. The teachers and students had positive attitude about developed CAI.

Kundu (2008) conducted a study on development and implementation of Computer Aided Instruction Programme for instruction in Geometry. The study was intended to check the effectiveness of CAI programme compared to traditional method and with reference to the reactions of the students. As the study being experimental in nature, two sections of Standard X (English Medium) were selected purposively. 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. Thus, nonparametric chi-square technique was used to analyze the data. The findings showed that the CAI Package developed to teach Triangle portion of mathematics to the students of Class X, was proved effective in terms of the students' academic achievement. Also, the students responded positively towards learning through CAI Package.

Maheta (2009) developed and studied the effectiveness of Computer Assisted Instruction (CAI) Programme for instruction in Geometry at primary level. The research aimed at studying the effectiveness of the package in the context of the academic achievement of the student and students' reactions towards learning through the package. The research design adopted was 'Two groups randomized subjects only posttest designs'. 288 students were selected randomly and formed two groups. The data for analysis were collected by teacher made unit test and opinionnaire. T-test and Chi-square technique were used for the analysis of the data. The findings showed that Computer Assisted Instruction (CAI) Programme for Teaching the Units 'Basic concept of Geometry' and 'Circle' in Maths for Standard V group did not score significantly higher on post-test. And the CAI Programme for Teaching the Unit 'Triangle: Equilateral of triangle' in Maths for Standard VI group scored significantly higher on post-test. The students opined favorably for learning through Computer Assisted Multimedia Package.

Nalayini (1998) conducted a study on development and validation of Computer Assisted Instruction in Physics for high school students. Investigator also studied the effectiveness and analyzed the variation among the students in the acquisition of various cognitive skills by learning through CAI. It was based on a unit 'Electricity' in Physics of std. IX. Investigator has selected the Quasi – Experimental design. Total 200 students of Std. IX were selected from Kendriya Vidyalaya and Sri Padmavathy Ammal matriculation school. The data were collected through Culture Fair Test scale published

by Institute for Personality and Ability Testing; Science attitude scale; Interim test (unit test) and Achievement test prepared by the investigator. The data were analyzed with the help of t-test and correlation technique. Findings of the study proved that the prepared CAI in teaching of Physics was found effective in terms of achievement of students and CAI was also found better than traditional method of teaching.

Panchal (2006) conducted a study on "Development and Tryout of Self-Learning Materials in English subject on the unit of 'Active and Passive Voice' for the Students of Standard-XII". The study aimed at comparing the mean achievement scores of the students on simple tense, continuous tense, perfect tense, simple modal auxiliaries, perfect modal auxiliaries, infinitive, participle, causal construction, imperative sentence and active and passive voice on pre-test and post-test. To compare the mean gain scores of experimental and control groups, a sample of 192 students had been drawn using compatible sampling techniques. Experimental Group Control Group pre-test post-test design as well as, single group pretest post-test design had been suitably employed for the Study. The Self-Learning Material on the topic of Active and Passive had been developed. Desai Verbal and Non-Verbal Group Intelligence Test, the Sub-Criterion Tests, Main Criterion Test, and Opinionnaire constructed by the investigator were used as the tools. Correlated t-value, Independent t-value, ANOVA, ANCOVA, and Chi-square had been suitably used for data analysis. The finding showed that grammar through self-learning material as evident through the pre-test and post-test status through mean achievement on respective sub-criterion tests. There was a significant effect of the interaction of stream and area on the mean scores on main criterion test at post-test stages. The students had favorably opined on the self-learning material.

Patel (2009) conducted a study on development and implementation of CAI to teach English grammar to Std. VIII students in different modes. The effectiveness of the CAI was studied in terms of achievement of Std. VIII students in English Grammar and reactions of the students about the developed CAI. Two schools were selected purposively. Students of Kelvani School were treated as the Control group and students of Bright day school were treated as the experimental group. The required data were collected with the help of pre-test, post-test and reaction scale which were constructed by the researcher. ANOVA was used for data analysis. The findings of the study showed the higher achievement of the students in English Grammar taught through CAI

than that of the students taught through traditional method. And from the three modes of the presentation teaching through CAI with discussion was found significantly effective in comparison with the other two modes.

Prabhakar (1989) conducted a study on development of software for Computer Aided Instruction (CAI) and its comparison with traditional method for teaching 'Semi-conductors' at higher secondary level. The study was experimental and pretest-posttest control group design was used. The two groups were equated with respect to intelligence. Sample comprised a total 203 students of class XI and XII from the schools of Indore city following CBSE syllabus. The different tools were used like Study Habits Inventory by Mukhopadhyay and Sansanwal, Scientific Attitude Scale by Grewal, Maudsley Personality Inventory by Jalota and Kapoor, Adjustment Inventory by Singh and Singh, Standard Progressive Matrices by Raven, Criterion test on selected topics of physics and Reaction Scale for the collection of data. Data were analysed with the help of percentile, mean, correlated t-test, coefficient of variance, chi-square test, ANOVA and ANCOVA. The CAI was found to be effective in terms of achievement of students of Class XI and class XII. Also, it was found to be effective in terms of reactions of the students. Both the classes XI and XII students were found to be equally favorable towards CAI material when the groups were matched with respect to pre-test.

Rathod (2005) conducted a study on "Development and Implementation of an Information Technology Based Instructional Package for English Grammar to Gujarati medium students of Standard VIII of Jamnagar City". The objectives of the study were to develop and study the effectiveness of an IT based instructional package for teaching English Grammar in terms of the achievement of the students and their reactions on the developed instructional package. Pre-test post-test control group design was employed for the study. The development of the IT based instructional package was done through Microsoft power point. 100 students were randomly selected from standard VIII as the sample. These students were further divided into Experimental and Control groups. Mean, SD, uncorrelated 't' value and chi square were computed for the data analysis. The developed IT based instructional package was found to be effective for teaching English Grammar because there was a significant difference in the gain mean scores of the experimental group and control group. The students were found having positive reactions towards the developed IT based instruction.

Rathwa (2007) conducted a study entitled, “Development and Implementation of Multimedia Package for teaching Gujarati Subject”. Objectives of this study were to develop and study the effectiveness of a multimedia package in Gujarati subject for std. VII students. And to compare the achievement of the students in the unit test conducted for experimental and control groups. This study was Experimental in nature. Achievement test and reaction scale prepared by the investigator were used to collect the data. Study revealed that developed multimedia package was found to be effective and had significant effect on achievement of experimental group in comparison with the control group. It was observed through opinionnaire that multimedia package was effective and students enjoyed learning through it.

Ruttanathummatee (2004) conducted a study on Effectiveness of Computer Assisted Instruction for Primary School Students. It was intended to know the effectiveness of Computer Assisted Instruction in the subject of Thai language developed by investigator for the students of Pratom-3 and Pratom-6. 150 students from each Pratom were selected as the sample. Pre-test, Post-test design with replication groups was used for conducting the experiment. SD and t test were used for data analysis. The findings of the study revealed that the CAI Packages developed by the investigator on Thai language had been found effective at both the levels, that is, Pratom-3 and Pratom-6.

Sakhiya (2006) conducted a study on effectiveness of Work-card and Programmed Learning as Self-learning techniques with reference to teaching of English grammar. It was intended to prepare the work card material and PLM on the three units of English grammar like Active and Passive Voice, Tenses and Clauses. Investigator also prepared a teacher made test to study the effectiveness with reference to achievement level. A sample of 294 students of Std. IX studying in two Gujarati medium schools of Rajkot city was selected purposively. The study was based on Experimental design. T-test and other relevant statistical techniques were used for analysis of the data. The study revealed that in teaching of English grammar, the work card material was more effective than the programmed learning method. And the programmed learning method was more effective than the lecture method for the boys having high achievement level in English.

Sharma (2003) conducted a study aiming at the effectiveness of Computer Assisted Learning in chemistry for the students of Std. XI. Investigator studied the effectiveness of CAL with respect to students' achievement and their reactions regarding developed CAL. In this study the investigator employed the 'Pre-test, Post-test, Experimental design'. The data were collected with the help of pre-test, post-test and reaction scale which were constructed by the researcher. Investigator found that CAL was effective for teaching Chemistry. It helped the students to learn the topic of 'Organic compound' and clarified the concepts. Students were found to have positive reactions towards the developed CAL. Students' reactions towards the CAL were found to be favorable with respect to the statements related to the interest, mode of presentation, content, clarity and the questions asked in the CAL.

Suwana (2004) studied the Effectiveness of Computer Assisted Instruction for Primary School Students. It was intended to know the effectiveness of CAI developed by ONPEC for primary school students to learn English language and to provide suggestion to ONPEC for improving CAI Program on the basis of obtained data. Investigator used multistage sampling technique. The investigator selected two cities by purposive sampling technique. Next, the students from standard XI from each school were selected by simple random sampling technique. In each school two groups, each of 30 students were formed. In this way, total 120 students were selected from two schools. The statistical technique t test was used to find out whether the mean scores of each group differ significantly or not. The findings of the study showed that CAI was found significantly effective in learning five topics of Thai subject. And the CAI developed by ONPEC was also found significantly effective in learning five topics of English subject to the students.

Thakkar (2006) conducted a study entitled, "To develop and implement CAI for 'Organization of commerce and management' subject in Standard XI as prescribed by GSEB." A pre-test experimental and control group research design was used for the study. This research intended to study the effectiveness of developed CAI for the chapter 'Foreign Trade' selected from the subject 'Organization of Commerce and Management' Standard XI. The findings of the study revealed that CAI was found effective in teaching 'Foreign Trade' leading to increase in the mean of gain achievement scores of the experimental group. The overall reactions of the students

towards the prepared CAI in commerce was found positive. CAI was perceived by the majority of the students to be quite interesting and motivating in learning.

Tyagi (2013) developed Computer Assisted Instruction Module in Biology for class XII. He compared the achievement of the students with respect to Computer Assisted Instruction and conventional teaching in the subject of Biology. This study was intended to compare the achievement of the students on the basis of sex and intelligence. The study was consisted of a sample of 50 students studying in XII class. This study used different tools for the collection of data like Computer Assisted Instruction module on 'Genetics', Performa for Assessment, Group Test of Intelligence (GGTI), Achievement test on 'Genetics', Retention test and Reaction scale for students. The result of the study showed that Computer Assisted Instruction provided greater opportunities for the students to learn. CAI found better than the traditional method of learning.

Yadav (2004) conducted study on "Development of an IT enabled Instructional Package for Teaching English medium students of Vadodara city". The objectives of the study were to develop an IT- enabled instructional package for teaching English Grammar and to determine its effectiveness in terms of achievement of the students and opinions of students and English teachers. A single group pre-test post-test design was employed for the study. 20 students were randomly selected from Std. VIII of the New Era Senior Secondary School, Baroda. The data were analysed through 't' test, percentages and content analysis. It was found a significant gain in terms of students' achievement through IT- enabled instructional package. It helped the students to learn kinds of sentences, namely interrogative, assertive, affirmative, negative, imperative: orders or commands and exclamatory. The students and teachers were found to have favourable opinion towards the developed instructional package.

Zyoud (1999) developed a computer assisted English language teaching programme for VIII standard students. It was intended to study the effectiveness of the programme in terms of students' achievement with respect to vocabulary, grammar and comprehension. 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 tools were used for data collection like Raven's progressive matrices sets A, B, C, D and E (Raven, 1960). Junior Index of motivation by Frimer

(1970) and translated into Gujarati by Desai (1970). Findings of the study showed that when computer is used to its full potential it can create an atmosphere where the students can learn and interact with the computer without being afraid of the teacher's presence. The study proved that the prepared programme in teaching of vocabulary, grammar and comprehension was found effective in terms of achievement of students and found better than traditional method of teaching.

2.1.2 REVIEWED STUDIES CONDUCTED IN ABROAD

Beaird (2007) conducted a study entitled "The effects of computer-assisted language learning on English language learners with and without disabilities in an elementary school setting". The purpose of the study was to investigate the effects of the English Language Learners Instructional System (ELLIS) on oral, written and reading achievement among students. Additionally, levels of teacher satisfaction with computer-assisted language learning (CALL) and the use of ELLIS were assessed. Participant were 78 third, fourth and fifth grade students with and without disabilities enrolled in a public elementary school. They were randomly assigned to one of three groups. Data were collected to answer eight research questions related to the effectiveness of the ELLIS program. Data were analysed quantitatively as well as qualitatively with ANCOVA. The study revealed that the students with disabilities who received instruction using the ELLIS program performed similarly to the students with disabilities who did not receive instruction using ELLIS program in oral language, written language and reading achievement. Paired instruction using the ELLIS software program had similar effects on student performance as individual instruction using the ELLIS software program. And results from the open-ended interview revealed high levels of teacher satisfaction with the ELLIS software program.

Chien-Yu (2004) conducted a study on effectiveness of implementing Computer-Assisted Language Learning technology in the English for specific purposes training program. An increasing number of private and public organizations and educational institutions are incorporating Computer-Assisted Language Learning (CALL) technology in either their traditional classroom setting or online English for Specific Purposes (ESP) training programs. In the role of facilitating students' learning, it is important for all stakeholders of ESP training programs to investigate the effectiveness of implementing online learning CALL systems into the distance learning

environment and the traditional classroom environment of the programs. In order to determine the "effectiveness" of a corporate ESP training program, the approach for this study was to evaluate trainees' on pretest and posttest related to the ESP training program. Under this 'One group pretest and posttest design' based study, a group of 18 Chinese adult male trainees enrolled in a flight academy's Aviation English training program that implemented with online learning CALL technology blended with an instructor, in central Florida. In addition, a survey was done to collect data on students' basic information, attitudes toward learning English with CALL technology, motivations for study English and their perceptions of CALL technology as facilitating interactions among students. The study found that within two months of the implementation of the blended learning in the Aviation English training program, participants had shown significant improvement in their test scores. Participants in the study generally had positive attitudes toward learning English with CALL, before and after two months of the Aviation English training program. They also had positive perceptions for CALL technology in facilitating interactions in the classroom, before and after the training program. The study also found that participants who had positive perceptions of CALL in facilitating interactions in the classroom tended to have positive attitudes toward using CALL in learning English.

Crews (2003) conducted a case study investigating the effectiveness of a CAI reading tutorial to help poor readers. The 13 participating students were fourth and fifth grade students with poor reading abilities as determined by the independent assessments and observations of their homeroom teachers. The multimedia CAI program supported the active cognitive participation of the learner, delivered multi-sensory instruction and provided feedback timely. The instruction was individualized and self-paced. Results of pre-post reading comprehensive tests and interviews indicated that poor readers completing the CAI tutorial significantly improved their reading skills and their teachers felt that using the CAI tutorial helped the students become better reader.

Dellario (1987) conducted a study on the Effects of Computer Assisted Instruction in Basic Skills Courses on High-Risk Ninth Grade Students. The purpose of this research was to determine the effects of Computer Assisted Instruction (CAI) in basic skills of English and Mathematics on high-risk ninth grade students. Utilizing an ex-post facto design, the study was undertaken to determine if CAI courses make any

measurable difference in students' academic achievement. The study also examined three nonacademic concerns related to the school-imposed, high-risk label carried by these students: attendance, student behavior, and dropouts. Data were collected from school personnel on 384 ninth grade students enrolled in four high schools of two urban school districts. The instruments utilized in this study included the Metropolitan Achievement Test, the Nelson Reading Test, the Stanford Diagnostic Mathematics Test, and the California Achievement Test. The finding of the study contains an important information for educational planners and future researchers. By knowing some academic areas are meeting with success and some nonacademic areas are also positively influenced, better determinations can be made about future uses of computer assisted instruction in academic environments.

Dewberry (1987) conducted a study on an exploration of linguistic pragmatics describing an exemplary model for computer assisted instruction in English as a second language with pragmatics as content. This study examines linguistic pragmatic theory, studying the terminology and organizing the concepts into a coherent whole. The study then analyzed both the development and pilot testing of a Computer Assisted Language Learning (CALL) module for teaching pragmatics in English as a second language (ESL). Passive voice in discourse was selected as the content. Thus, this study clarified pragmatic theory, and creates an exemplary model of Computer Assisted Instruction with pragmatics as content. The study found pragmatics warrants a modified systems approach for the design and development of Computer Assisted Instruction (CAI).

Dzekoe (2013) conducted a study on facilitating revision in the English as a second language (ESL) composition classroom through Computer-Based Multimodal Composing Activities (CBMCA). It analyzed how 22 students used the CBMCA to facilitate self-revision as they composed academic papers. Data collection and analysis were based on a descriptive case study with embedded quantitative data and an integrated theoretical framework of Multimodality (Kress &Van Leeuwen, 2001), Noticing Hypothesis (Schmidt, 1990), and Multidimensional Model of Revision (Stevenson, Schoonen, & Glopper, 2006). Data included surveys, students' revision history, posters, listening activity, integration of visual and written texts, reflections, stimulated recall interviews, final written drafts and scores on those drafts. The findings indicate that the CBMCA had the potential to facilitate self-revision in the L2 writing classroom; and that there was the need for L2 writing researchers to re-conceptualize

“draft”, to focus on revision history rather than between-draft revisions; and pay equal attention to pre-text and point-of-inscription revisions.

Galvis (2007) conducted a study entitled “Computer- Assisted Instruction (CAI) as a teaching tool for occupational therapy education: A guide to understand CAI design and effectiveness”. The primary purpose of the study was to compare the effects of CAI versus traditional teaching methods on occupational therapy students. To explore the topic, three consecutive and inter-related studies were conducted. The result of this research could assist occupation therapy and other allied health educators to understand the advantages of CAI materials. In its analysis researcher found that the CAI was effective compared to traditional classroom lecture to teach practical skills and theoretical knowledge. It was also found that CAI could provide faster instruction under learner-centered training.

Gilbert (2006) conducted a study entitled “Effectiveness of Computer Assisted Instruction blended with classroom teaching methods to acquire automotive psychomotor skills”. Here two blended learning methodologies of web-based CAI and face to face classroom instruction were investigated in the Automotive Technology Department at Southern Illinois University Carbondale. Results were determined by a psychomotor electrical diagnostic skill evaluation of two matched group exposed to different blending methods of teaching basic electrical concepts. Analysis revealed that the blended teaching methods experienced by the experimental group demonstrated a comparative higher level of psychomotor electrical diagnostic skill capability.

Hsu (1994) conducted a study entitled “Computer Assisted Language Learning (CALL) to see the effect of Elementary Language Students (ELS) use of interactional modification on listening comprehension”. The purpose of this study was to describe ESL students' moves (i.e., based on the principles of classroom discourse analysis), requesting modifications (i.e., requesting dictionary, aural repetition, or text reinforcement) on the input they received while working on this program which confronts them with new linguistic material and to describe the relationship between those interactional computerized modifications which ESL students request and their listening comprehension scores. Data were collected from 15 elementary second language students by using a single group pre-test research design. The findings revealed that second language students used the tools made available by the computer

technology to make input comprehensible, computerized modification and language acquisition.

Humphreys (2001) conducted a study on, “A Descriptive Analysis of a Computer-Assisted Instruction Developmental English Program.” The purpose of this study was to describe students’ performance, experience, knowledge, and perceptions while enrolled in a developmental English program designed to prepare community college students for successful completion of a basic English class through the use of computer-assisted instruction. The participants in this study were traditional and non-traditional male and female adults who attended John A. Logan College. Information was collected for developmental students who were enrolled during the Fall 1994, Spring 1995 and Spring 1996 semesters. Participants took the Asset Test which determined the level of entry for developmental English course or courses. During the Fall 1994 and Spring 1995, a total of 4,367 students took the writing and reading skills tests. Of those 4,367 students, 959 (21.9%) scored in the remedial range while 1,089 (24.9%) scored in the decision zone (recommended but not required). A total of 448 subjects participated in the convenience sample of English courses at John A. Logan College. Of the total number of subjects, 446 subjects were students and two instructors who participated in a focus group interview and observations. The results of the description revealed that 50% of the developmental English students enrolled in English, 101 earned a “C" or better with computer-assisted instruction. Students perceived that they benefitted from Computer-Assisted Instruction in English, experienced a positive learning experience, and gained transferable skills.

Longberg (2012) conducted a study on Evaluation of Imagine Learning English, A Computer-Assisted Instruction of Language and Literacy for Kindergarten Students. The present study sought to assess the impact of one such CAI program, Imagine Learning English (ILE), on both the receptive vocabulary and early literacy skills of 284 kindergarten students, including English language learners using a 2 x 2 cross-over research design over a period of a full school year. Results of the *t*-tests from this within-subjects design showed no treatment differences on outcome measures between students when they participated in the ILE program and when they participated in “other” classroom activities, regardless of amount of time spent on this CAI program. These same results held true for English language learners for whom the program was originally designed. A strong period effect, however, was detected, with the treatment

administered during period (i.e., either ILE or “other” instruction) having a more positive effect on students’ language and literacy learning than the treatment that was administered during period.

Merkel (1984) studied the effectiveness of using computer assisted instruction in the teaching of English as a second language. The study involving teaching of English as a Second Language at a private intensive English institute for international students examined the test scores provided for both Control Group and Experimental Group of students with the help of analysis of variance. The standard measure used is the Test of English as a Foreign Language (TOEFL), and the study attempted to show that with the addition of Computer Assisted Instruction to the regular ESL curriculum the ratio of reading proficiency scores to total test scores is higher for the Experimental Group than for the Control Group. The results of the study showed that the skill of reading was reinforced by the use of CAI and students in the Experimental Group had higher reading rates than those of in the Control Group.

Mulbery (2006) conducted a study on Effectiveness of Computer Assisted Instruction Compared to Traditional Instruction in a Basic Computer Proficiency Course at the Collegiate Level. The purpose of this study was to examine the effectiveness of CAI program on students’ achievement as measured by performance tests in computer proficiency course. This study was conducted in eight college computer proficiency sections in Utah. A Quasi-experiment design was used. Analysis of Covariance (ANCOVA) and Analysis of Variance (ANOVA) were calculated to compare students’ achievement in word processing, spreadsheet applications and database applications. Independent sample *t*- tests were used to compare differences between males and females and between traditional and nontraditional students’ achievement within the treatment group. Based on the findings, it was revealed that CAI was more effective on students’ achievement in computer proficiency courses. However, CAI did not have a different effect on males and females or traditional and nontraditional students. Finally, students believed that CAI training helped them learn software tasks and prepare for the performance tests.

Naba'h et al., (2009) conducted a study on “The Effect of Computer Assisted Language Learning in Teaching English Grammar on the Achievement of Secondary Students in Jordan”. This study aimed at investigating the effect of using an

instructional software program of English language on the achievement of secondary students in Jordan. The sample of the study consisted of 212 students distributed randomly on four experimental groups and four control groups. Four public schools were purposefully chosen from the Educational Directorate in Zarqa for convenience. The instruments of the study were an instructional software program for teaching the passive voice and an achievement test. An Analysis of covariance was used to find out the effect of the instructional program on the students' achievement. The findings of the study revealed that there were statistically significant differences between the students' achievement mean scores in grammar attributed to the instructional method of teaching, gender and stream of study.

Nuno (2005) conducted a study on: "Is Computer-Assisted Instruction an Effective Tool in the Reading-Writing Classroom?" The study demonstrates the real value of CAI in the classroom by evaluating several pieces of software. Furthermore, one specific piece of software was created and tested. This phonics software was tested with sixty students to further support the value and effectiveness of CAI in the reading and writing process. The software referred to, *Zoo Phonics* (Nuno, 1999), explores the forty-two phonemes of the English language. Students write what they can say in a phonetic way. Two kindergarten classrooms of thirty students each participated in the study. The results of this study clearly supported the value and effectiveness of CAI in the modern classroom.

Nutta (2000) conducted a study on "Is Computer-Based Grammar Instruction as Effective as Teacher- Directed Grammar Instruction for Teaching L2 Structures?". The study described to compare post-secondary English as a Second Language (ESL) students' acquisition of selected English structures based on the method of instruction—computer-based instruction versus teacher directed instruction. The population of the study consisted of 53 students enrolled in an intensive academic ESL institute of a major university in Florida. The independent variable was the method of grammar instruction, either teacher-directed or computer-based. The dependent variables were students' achievement scores on three separate criterion-referenced tests over the selected structures. The results showed that no significant differences were found between the computer based and teacher-directed students' scores on multiple choice or fill-in the-blank tests. The results proved that computer-based instruction can be an effective method of teaching L2 grammar.

Peterson and Samuel (2009) conducted a study on "ICT Integration in Enhancing English Language Teaching and Learning". This study was undertaken with the purpose to unfold and understand the need for integration of ICT tools in the teaching and learning of English Language in Malaysian schools in particular oral communication skills. The study further examined the benefits of integrating ICT tools, the success factors and obstacles encountered by English Language option teachers in ICT integration. The study used a multiple-case design approach, involving mixed methods i.e. qualitative and quantitative approaches. A cross sectional questionnaire, teacher and pupil interviews were used to collect the data. It was found that the online tutorial using Instant Messaging tools not only improved their oral communication skills but further increased their attainment levels in terms of academic achievement and classroom participation. Another finding in the case studies revealed that the free audio and video conferencing tools embedded in Instant Messaging tools could be exploited by English Language teachers to enhance students' communication skills.

Rose et al. (1992) studied the effectiveness of Computer Assisted Instruction with special reference to underachievers Ph.D. Education Bharathidasan University. Objectives of the study were to develop and find out the effectiveness of CAI with TSS and CAI without TSS with references to the variables viz. sex, IQ and achievement level and to find out the interaction of the above variables and the treatment on the achievement score. The randomized block design was followed in the selection of the samples, with IQ as the blocking variable. The samples consisted of three groups of size 32 each composed of students of standard IX selected from Tamil Nadu State Board schools covering one rural and two urban schools. The underachievers in the sample were identified by using the regression analysis. The tools used included CAI software on the language of sets, achievement test, and culturally fair intelligent test by Cattell and cattell, study habits inventory and Mathematics study attitude scale. Mean, S.D, t-test, Chi-square, one-way and two-way ANOVA were used to treat the collected data. The study revealed that both the CAI strategies were superior to the traditional method of instruction, and CAI with TSS was more effective than CAI without TSS for underachiever (UA). And there was no relationship between the post- treatment scores and the variables 'sex', 'local' and 'achievement level' of the experimental group. In case of the variables IQ, 'Study habits' and 'math's study attitude', the relationship between those variables and achievement was found to be positive.

Shannon (2013) conducted a study on the Relationship between Time in Computer-Assisted Instruction and the Increase in Reading Skills. The purpose of this quantitative correlational study was to determine if any relationship existed between the amount of time students spent in a computer-assisted reading instruction program and the increase in reading skills as measured by an assessment of oral reading fluency. A Pearson Correlation analysis was used to determine the relationship between the amount of time 87 first-grade students spent in a computer-assisted reading instruction program and the increase in oral reading fluency test scores measured by the Dynamic Indicators of Basic Early Literacy Skills test (DIBELS). The Pearson Correlation analysis indicated a weak positive relationship between the variables. However, the weak coefficient of determination indicated that the correlation did not have any practical significance. This indication may imply that teachers should not allocate instructional minutes to computer-assisted instruction for the purpose of increasing oral reading fluency.

Tozcu (1998) conducted a study on the effect of teaching sight vocabulary with Computer Assisted Instruction on vocabulary gain, decrease in reaction time for frequent word recognition and reading comprehension. This study is about the effect of direct vocabulary instruction using CAI on vocabulary knowledge, reading comprehension and speed of word recognition. In this experimental study the students in the treatment group studied the highly frequent words of English on the computer for three hours per week and for eight weeks whereas the students in the control group completed three hours of reading and reading comprehension exercises. The research findings showed increase in vocabulary gain, reading comprehension, and decrease in reaction time for frequent word recognition in case of both the groups. However, the treatment students showed significantly greater gains than the control students.

White (2006) Conducted a study on the Effects of Computer Assisted Instruction on Learning English Language Arts. The Exploring Compound Words software used as the basis of the study, was developed by the researcher to aid students in English-Language Arts, interactively increasing their vocabulary development. The study systematically investigated the effects of Computer Assisted Instruction on learning compound words and fully incorporates the six levels of Bloom's Taxonomy to further enrich, enhance and extend the students' learning process. Twenty fourth graders, including both male and female students, were selected to participate in this

study. These participants were tested to determine whether their English-Language Arts skills could be improved by using the interactive program. The participants were given pretest, treatment and posttest. All pretest and post-test scores were compiled and scored with a paired t-test. In comparing the pretest and post-test scores, the results showed a significant increase on the post-test scores of the participants, thereby indicating that the students' language arts skills improved with the help of Computer Assisted Instruction.

Yang (2008) conducted a study on Integrating the Task-Based Approach and the Grammar Translation Method with Computer Assisted Instruction on Taiwanese EFL College Students' Speaking Performance. This study was to investigate the integration of the task-based approach with computer-assisted instruction and the Grammar Translation Method with Computer Assisted Instruction on Taiwan College students' speaking performance. Ninety-Three Taiwanese EFL college students from the Hsing Wu College were selected to participate in the study. The study was a mixed method research which included quantitative and qualitative method. The results of the study indicated that students of the task-based approach with Computer Assisted Instruction showed the higher post-test speaking scores than students of the grammar translation method with CAI; in particular. The task-based approach with CAI showed a significant increase in their scores from the pretest to the posttest.

Zhao (1996) conducted a study on Attitudes of Directors of Intensive English as a Second Language Programs Toward the Use of Computer Assisted Instruction in American Universities. The study examined attitudes of ESL directors toward Computer-Assisted Instruction in American universities, and demographic characteristics of these universities and their ESL programs. A modified version of Menke's (1989) questionnaire was distributed to 203 ESL directors with a return rate of 71 per cent. Stratified random sampling was used to select subjects. ANOVA was used to analyze the data at an alpha level of 0.05. Most of ESL directors were female, in the age group of 41-50 with computer abilities above average. Directors with CAI more strongly agreed than those without CAI that computer is the most viable model they had of how human mind functions, and a powerful tool for increasing students' participation in language learning. Directors without CAI more strongly agreed than those with CAI that ESL teachers perceived CAI as disruptive and threatening to their jobs.

2.2 IMPLICATIONS FOR THE PRESENT STUDY

Overall 50 studies were reviewed by the researcher out of which 27 studies were conducted in India and 23 studies were conducted in foreign countries. 19 studies were conducted at the Elementary and Primary level of education. 9 studies were conducted at secondary education level. 9 studies were at higher secondary education level. 13 studies were conducted at Higher Education level.

The studies of Babitha (2015), Badiyani (2008), Zyoud (1999), Beaird (2007), Crews (2003), Das (1998), Hsu (1994), Karia (2001), Yadav (2004), Longberg (2012), Maheta (2009), Nuno (2005), Patel (2009), Rathod (2005), Rathwa (2007), Ruttanathummatee (2004), Shannon (2013), Suwana (2004) and Tozcu (1998) were conducted by using CAI or CALL at Primary level.

The studies of Acharya (2005), Barot (2009), Bhutak (2004), Dellario (1987), Hirani (2007), Kundu (2008), Naba'h et al., (2009), Peterson and Samuel (2009) and Sakhiya (2006) were conducted by using CAI or CALL at Secondary level.

The studies of Gupta (1987), Jeyamani (1991), Khirwadkar (1998), Nalayini (1998), Panchal (2006), Prabhakar (1989), Sharma (2003), Thakkar (2006) and Tyagi (2013) were conducted by using CAI or CALL at Higher Secondary level.

The studies of Chien-Yu (2004), Dewberry (1987), Dzekoe (2013), Galvis (2007), Gilbert (2006), Humphreys (2001), Merkel (1984), Mulbery (2006), Nutta (2000), Rose et al. (1992), White (2006), Yang (2008) and Zhao (1996) were conducted by using CAI or CALL at Higher Education level.

In most of the studies, the quasi-experimental design was followed by almost all the researchers. As no study was found related to the teaching of English Grammar mainly for Gujarati medium students, researcher considered the present study with an intervention programme based on English Grammar teaching with the help of CAI. In most of the studies tools and techniques like achievement test, opinionnaire, final written draft, criterion tests, reaction scales, teacher and pupils' interview, observation of students, multimedia packages and software etc. were used to collect the data.

The reviewed literature has established the effectiveness of using the computer as a tool under the instructional process. It has further motivated the learners to do the

work even on their own at their ease. The reviewed literature further revealed that there is a dearth of studies conducted on development and effectiveness of CAI especially related to need-based grammatical aspects in English. In fact, few studies are available focusing on the development of CAI in English grammar but that were not developed keeping in mind the requirements of the learners that is in terms of the hard spots of learning for them.

By the review of related studies, the investigator has come across certain studies conducted in India as well as in Abroad, in the field of teaching and learning using CAI and multimedia packages. These studies have revealed that teaching-learning process becomes more interesting, enjoyable and prolonged. Further the studies have found that the use of CAI or multimedia packages proved to be well suitable and effective for different areas of instruction (Population Education, Environmental Education and other school subjects), different categories of students (Slow learners, Talented), different levels of education (Primary, Secondary, Higher Secondary, College) and for different mediums, too.

The studies conducted by Jeyamani (1991) and Zyoud (1999) had found the use of CAI as an effective approach compared to any other traditional method of teaching in different subjects.

A sizable number of studies reviewed like Karia (2001), Khirwadkar (1998), Prabhakar (1989), Sakhiya (2006) and Sharma (2003) revealed that the CAI can be used as a supplement to the instructional process. They have mentioned that there was a significant improvement in students' achievement because of using CAI. Also, the studies proved that the CAI was significantly more effective than conventional instruction.

Acharya (2005), Bhutak (2004), Badiyani (2008), Das (1998), Hirani (2007), Nalayini (1998), Patel (2009) and Zyoud (1999) revealed that students learning rate were found faster with CAI than that of conventional instruction. The students have also given favorable reactions towards the use of CAI. The use of CAI has been found effective in various subjects. Some of the studies have found that composite modes of instruction may not have always resulted in higher cognitive learning in languages. Interactive modes of instruction in languages through Computer Assisted Learning

Material (CALM) have been found quite effective. Along with this, it was also observed that using CAI in various subjects found useful for the learners of varied profiles.

2.3 CONCLUSION

The results of the reviewed studies showed that CAI can be used as a supplement to traditional instruction and that has a significant effect on students' achievement. Also, the studies proved that the CAI was found significantly more effective than conventional instruction. Thus, a review of the literature yielded encouraging evidences indicating the effectiveness of CAI to increase the academic achievement of students in general and making the teaching-learning process more interesting - enjoyable - prolonged, in particular. With this gain related to conceptual knowledge, research methodology and research gap, the overall description of the methodology for the present study has been described in the upcoming chapter.