

CHAPTER II

REVIEW OF RELATED

LITERATURE

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CHAPTER II

REVIEW OF RELATED LITERATURE

2.0.0 INTRODUCTION

Conceptual frame work of the current research problem and primary matters regarding the research are dealt with in chapter 1. It comprised the statement of the problem various important terms defined, objectives for the study, hypothesis that under-line the study, importance and the delimitation of the study. Researches and the outcomes of the same is core to the development of any discipline and its theory, principles, rules and laws that functions as a framework for the dissemination of the knowledge of a discipline. No problem in any discipline can be better resolved without referring to the past and the actions taken in the past and so no researches can be better conducted without being familiar to theories and researches undergone in that area. It allows the researcher to have an in-depth insight about the quantum and the quality of work done in the concerned area. To assure and get acquainted to this basic knowledge a review of the research literature is done. Though not a “Tailor Made Jacket” to a problem, to the great extent the clarity to the problem becomes possible with the thorough understanding of the knowledge that is already generated in that area of research. It becomes the source for hypothesis that can be well established after thorough knowledge barring the duplication and replication of research work. It directs towards the method and procedure of study, sources of data and statistical technique to be adopted that can prove appropriate as the solution to the problem. The present researcher after referring to and reviewing the related literature makes an attempt to develop an insight regarding strong points and limitation of the preceding studies thereby enabling him to improve his own investigation and search to arrive at the proper perspective of his study.

The review of related literature considered and studied by the researcher shall be based on the researches conducted in India and abroad and related to the field of teaching Social Science and Geography, and on teaching through multimedia or related methods like Computer Assisted Instructions (CAI) specifically CAI in various subjects and in specific to teaching Geography i.e. Multimedia approaches to

teaching. The aim, objective and intention was to attempt to refer and cover majority of the relevant and accessible studies under researcher's per-view, but researcher doesn't claims them to be the only studies in the relevant area. The researcher came across the following literature which would help him to have an insight in the research topic.

Review of related literature broadly covers studies related to following categories conducted in India and abroad.

- Researches on teaching Geography and/ or Social Science;
- Researches on teaching through Multimedia or related methods like Computer Assisted Instructions (CAI) specifically CAI; and
- Researches on teaching through Multimedia or related methods like Computer Assisted Instructions (CAI) specifically CAI in teaching Geography.

The studies have been analyzed by keeping objectives, methodology and findings of the study in mind to portray the conclusion to reinforce the rationale of the present research.

2.1.0 REVIEW OF RELATED LITERATURE CONDUCTED IN INDIA

Below mentioned are some of the studies conducted in India in relation to the area of present study.

2.1.1 Researches on Teaching Geography and Social Science in India

Total eighteen studies were found and analysed in the area of teaching Geography and Social Science in India

D,Souza (1971), dealt with the Geography concepts and approaches to develop skill in teaching geographic concepts effectively. The researcher conducted a study on regional concepts in teaching of Geography and attempted to study and compare the test scores obtained through an objective test after teaching Geography by systematic method i.e. taking the whole country as a the geographic unit and by regional method i.e. taking region of the county as the geographic unit. Findings of the study revealed that the frequency distribution, frequency polygon and ogives showed that scores of

the group taught by regional method were higher than those of group taught by the systematic method. The researcher concluded that there is a great need first to identify the different geographical concepts and then develop suitable learning experiences in the teaching of regional and general Geography. The researcher further opined that some of the problems faced by the teachers stand in the way of concept development.

Patyal (1977), conducted a study of readability indices of prescribed Geography materials in Geography for standard VIII and its effectiveness on reading comprehension. The objectives were (i) To prepare a list of impediments out of all the chapters of Geography text book prescribed for class VIII by the state. (ii) To select a suitable formula for assessing readability of each chapter of the text book. (iii) To study the readability of the selected formula. (iv) To determine the readability index of each chapter. (v) To find out the chapters having high readability. (vi) To prepare a tool for measuring comprehension in Geography for three chapters. (vii) To study the effect of material of high and low levels of readability on the comprehension of pupils falling in upper and lower quartiles of distribution of scores on reading ability test in Gujarati. The findings of the study were (i) The range of readability levels of 32 chapters of the book under study was awfully large. (ii) The chapters of text book were not arranged in ascending order according to the level of difficulty. (iii) The technical words not explained, and (iv) It was found that low readability materials had positive effect on reading abilities and also on pupils having low and high intelligence. (*in Rudramamba, B.(2004) Problems of Teaching, eds Bhaskara, D. APH Publishing Corporation, p.46*)

Chakraborty (1978), did an inquiry into the strategies of classroom teaching. The broad strategies of the study were to find out the effectiveness of strategy one (Lecturing and question- answering), strategy two ((Lecturing and question- answering by using behavioural objectives) strategy three (Discussion by using instructional materials) on the development of knowledge, comprehension, application ability and total achievement in Geography of pupils of std IX and second objective of study was to find out the effectiveness of above stated strategies. The sample consisted of 150 students of 2 Bengali medium school. The achievement was on criterion test developed by the researcher. The collected data was analysed through the technique of analysis of covariance. The findings of the study revealed that the

strategy two was more effective than strategy one and strategy three was most effective. Lecturing and question - answering with behavioural objectives and discussion by using instructional materials were more effective than lecturing and question answering positively and conclusively.

Ponkshe (1983), conducted a study "To Enlist and Analyze the Concepts in Geography Covering the Syllabi for standards VII, VIII and IX of the Secondary Schools in Maharashtra State and to Develop the Methodology Effectively". The objectives were (i) To identify and enlist the concepts in Geography covering the syllabi for standards VII, VIII and IX of the secondary schools in Maharashtra state, (ii) To analyze the enlisted concepts. (iii) To investigate the extent to which the Geography teachers could analyze the concepts, and (iv) To develop a concept-oriented method to teach concepts in Geography and to compare its effectiveness with that of the traditional method. The study was in two phases with the concepts identified and analyzed in the first phase and methodology of teaching concepts developed and tried out in an experimental situation in other phase. 20 schools were selected through random stratified sampling method. Two groups of 611 students each from set of 10 schools each were formed and matched pairs were formed on the basis of the scores of a pretest. Tools comprised a questionnaire, an interview schedule and teacher made objective test developed by the investigator. For analysis t-test was used. The major findings were (i) The Geography syllabi were not concept oriented. (ii) Most of the Geography teachers were trained with about half of them with the subject of Geography either at the first degree or at the post graduate level. Nearly 75 percent Geography teachers had offered Geography as a special method at training level but most of them were unable to formulate specific objectives to teach concepts, analyze the concept properly and develop suitable learning experiences for teaching Geography concepts. (iii) Most of the schools had neither adequate teaching aids nor adequate books on Geography in their libraries. There was no tradition of organizing field trips to provide direct learning experiences to understand and retain Geography concepts. Films, Filmstrips, slides, models, specimens and pictures were not used systematic (iv) The teachers did not lay stress on concepts while teaching. There were no provisions for in-service training for the teachers (v) The concept oriented method was found more useful than the traditional method. The main educational implication is that teachers should be trained with the expressed objective of developing concepts.

Bhattacharya (1984), studied the “Effectiveness of various Models for Teaching Geography in Relation to Institutional Resources.” The objectives were (i) to find out the effectiveness of teaching Geography through the Concept Attainment Model (CAM) in relation to institutional resources, (ii) to find out the effectiveness of teaching Geography through the Inductive Model (IM) of teaching in relation to institutional resources, (iii) to compare the effectiveness of teaching Geography through the CAM and IM of teaching in relation to institutional resources, and (iv) to find out the interaction effects of the different levels of educational institution resource status, models of teaching and types of concepts taught on the gain in achievement scores of junior high school students in Geography. The major findings were (i) The CAM group of students did not differ significantly in achievement from the traditional teaching technique group in high resource status educational institutions. (ii) The students taught through the CAM showed better achievement in Geography than the traditional teaching technique group in average and low resource status educational institutions. (iii) The IM group proved itself to be more effective for achievement in Geography in comparison to the traditional teaching technique as well as the CAM, irrespective of the resource status of educational institutions. The Models of teaching approach produced better achievement in Geography even in average and low resource status educational institutions.

Chaudhary (1985), conducted an experimental study entitled “Preparation & Evaluation of Programmed Learning Material in Geography for Secondary Level” with the objective to prepare and evaluate the programme in terms of learning induced among the readers by reading the programme. The secondary objectives of the study were to evaluate the effectiveness of the programme. It employed the single group, i.e. pretest/post-test design. The sample comprised of 300 students of classes IX and X drawn from ten secondary institutions of Faizabad city and rural areas in the neighbourhood. For collecting data the investigator prepared programmed material and an achievement test in geography on the content of the programmed learning material. The collected data were tabulated and analysed using suitable statistical techniques. The findings of the study revealed that the students gained significantly in the knowledge of the subject by reading the programme and was equally effective in producing learning among the rural and urban population. However, the girls gained slightly more than the boys on this programme. The mean gains for the different

institutions varied to a fair extent but all these gains were highly significant. The findings affirmed the effectiveness of the programmed material in inducing learning among the students and its effective usage to teach the content to the students of classes IX and X without any fear of failure and for junior students as well. In view of the dearth of effective Geography teachers, a careful preparation of programmed material on the difficult contents of Geography could be tried.

Dhamija (1985), conducted “A Comparative Study of the Effectiveness of Three Approaches of Instructions- Conventional, Radio-vision and Modular Approach on Achievement of Students in Social Studies” with the objectives (i) to compare the achievement of students of class VII in Social Studies (History, Geography and Civics) when taught through three different approaches (ii) to compare the achievement, retention, and involvement of students in geography, history, and civics when taught through these three approaches. A three-way factorial design was followed where three factors were involved, namely approaches of teaching (radiovision, modular and conventional), intelligence (high, middle and low) and testing occasions (pretest, post-test and retention test). The students were administered the achievement test, retention test, and Students' Involvement Scale. The findings related to Geography revealed that the students achieved highest knowledge achievement scores in geography when taught through radio- vision. High intelligent students scored highest knowledge achievement scores and comprehension scores in geography when taught through radio-vision approach. The retention on knowledge, comprehension and total achievement scores was the highest in that group of students who were taught geography through the radio- vision approach. The involvement of students in the class- room was maximum when they were taught through the radio-vision approach.

Khan (1985), conducted a study entitled “A Study of Teaching Geography at the Secondary School Level in Bangladesh”. It was a survey conducted to find out the status, position and the ways Geography was taught at the secondary school level in Bangladesh. Findings of study indicated that most of teachers of Geography were not fully qualified to handle the subject in terms of a degree of Geography and for professional training in methodology and therefore, mostly, the lecture method in teaching was adopted by them. Audio-visual teaching and learning aids, including

maps, were not considered necessary and were not used in class field trips and excursions found limited usage in both urban and rural schools. The problem that teacher faced related to lack of needed facilities and the required knowledge to teach the subject. An important suggestion advocated by the researchers to solve the problems of the teachers appears to be the organization of in-service programmes in both content and methodology.

Patil (1985), conducted a survey study entitled “An Inquiry into the Present Position and Problems of Teaching Geography in the Rural Secondary Schools of Solapur District.” The objectives were to study the existing facilities available for teaching of Geography in rural secondary schools, professional preparation of Geography teachers, and the methods and techniques followed in the teaching of Geography further to suggest measures helpful in improving the teaching of Geography. The study was of survey type. The tools used were questionnaire, structured interviews, visits and observation. The schools covered were 155 and the estimated Geography teachers were 360. The data collected were analyzed using percentages and authentic means. Major findings stated that there were no facility of a Geography room nor museum was available in a large number of schools and the facilities of library and teaching aids were inadequate. The teachers of Geography though academically and professionally well qualified, could not participate in the in-service programmes and the activities of the subject teachers associations for various reasons. Teachers reflected that the objectives of teaching Geography could rarely be achieved through regular teaching due to inadequate time. The majority of teachers followed traditional methods such as lecture or question answer method.

Jani (1987), conducted a survey study entitled “A Study of the Present Position of Teaching Geography in the Secondary Schools of Gujarat.” The objectives were (i) To study the prevailing position of the teaching of Geography in the rural and urban areas of city. (ii) To study the qualifications and experience of the teachers teaching Geography (iii) To study the text books of Geography prescribed for different standards in Gujarat in the light of curriculum of Geography (iv) To study the availability of teaching aids and other facilities like library, and their use in the teaching of Geography and (v) To study the prevailing position of the evaluation system in the subject of Geography in Gujarat. The method of study followed was that

of survey for collecting data, the researcher prepared a questionnaire. The data were analyzed and descriptive statistics were used for data analysis. The researcher found out that (i) 50 percent of teachers were not qualified in the subject of Geography and about 52 percent of the teachers teaching Geography did not have Geography as a method in their B.Ed. level teacher training. (ii) About 77 percent of the teachers were teaching Geography through lecture method and without the use of teaching aid. (iii) Teaching aid facilities in 52 percent of the schools, especially in Geography, were not satisfactory. (iv) About, 42 percent of the teachers teaching Geography did not attend any refresher course or orientation programme. (v) About 83 percent of the teachers were of the opinion that curriculum required modifications in the light of modern developments in the subject. (vi) There was no clarity of the teaching of skills in the subject in 33 percent of teachers.

Shahi (1989), did a comparative study of inductive and deductive programming and the traditional teaching in Geography at the Secondary Stage. Major aim of the study was to compare learning in Physical Geography through inductive and deductive programming with traditional teaching. The study was experimental in nature. The researcher found that the inductive programme was effective than deductive programme and traditional teaching.

Gote (1997), underwent “A Critical Study of Geography-Textbooks for Standard 1 to 5 as per the Syllabus Prescribed by the Government of Maharashtra in 1989.” The objectives were (i) To study the external physical features of the text books. (ii) To find out the relation between content in the text books and objectives of teaching as per the syllabus. (iii) To find out the relation between Geographical concepts and content in the text books and whether the units in the text books are arranged by using concentric method and is it enough or not. (iv) To find out relation between illustrations & content and whether the content & exercise in the text books are relevant. (v) To find out whether the content in text books is correlated to each other internal branches of Geography subject, other school subjects and human life and the relation between Geographical values and content in the text books. (ix) To find out whether the content in text books is relevant to the core elements in NPE, 1986 and whether the text books are useful for the students in rural area as well as urban area also. Researcher used content analysis or documentary analysis & sample survey

method. 200 primary teachers for each standard, 30 experienced teachers and 12 expert teachers of Geography subject were selected as a sample. Opinionaire and percentage were used for collection and analysis of data. The findings revealed that (i) The content in each text book is relevant to the objectives of Geography subject at primary level. (ii) The units in each text books are arranged with proper sequence and are also as per psychological principle like attractive introduction that is based on a previous knowledge of the concerned students and the arrangement is as per the maxim easy to difficult and most of the units are arranged according to concentric method. (iii) The language in each text book is easy to understand with standardized words and Geographical terminology. (iv) Explanation of Geographical concepts in the text books is proper and enough. (v) The illustrations for an understanding of the content in the text books are appropriate and sufficient. But the maps are used in the text books for standard 3 to 5 only which are also useful and enough. (vi) The pictures in the text books are sufficient but not attractive and most of the teachers suggested them to be coloured to make them attractive. (vii) Most of the teachers suggested that the list of the reference books for supplementary reading is not given in any text book. (viii) The content in each text book shows appropriate correlation between internal branches of Geography subject, other school subjects and human life also. (ix) Each unit in the text books is given proper weightage with sufficient explanation easy to understand by the students in respective standard. (x) The content and exercises in the text books are easy to understand for the concerned age group of the students and are useful in life also and it (xi) The content in the text books helps to inculcate the Geographical values in the mind of students and involves higher percentage of five core elements of NPE, 1986.

Padhi (1998), conducted a study on “A Critical Appraisal of the Secondary School Geography Curriculum of Orissa.” The objectives were (i) To analyze the objectives of teaching Geography and syllabus in Geography in the light of opinion of teachers and students. (ii) To find out the relative importance of various topics. (iii) To compare the syllabus in Geography of Orissa with that of NCERT & CBSE (iv) To assess the present operational situations relating to Geography curriculum to assess (a) Adequacy of textbooks prescribed; (b) Methodological approaches adopted for teaching; (c) Facilities available for teaching the subject and (d) The evaluation process adopted for assessment objectives of teaching Geography. Researcher used

survey method. The sample comprised of 936 students, 312 Geography teachers, 69 Headmasters from 205 secondary schools and 60 Geography experts from different Universities. Researcher made questionnaires and percentage were developed by researcher for collection and analyzed of data respectively. The findings were (i) knowledge and understanding objectives are given more importance by Geography teachers and skill and map work and application by students. (ii) The weightage given to the subject Geography, in secondary school curriculum of Orissa verified from 5.71 percent to 6.66 percent during 1963 to 1991. (iii) The present weightage of 75 marks in Geography was agreed by teachers, head masters and experts. (iv) The present syllabus of Geography gave more importance to Physical Geography & regional studies of India and Orissa, whereas continental studies and solar system are neglected. (v) ICSE & CBSE examines only the syllabus of class X whereas Orissa, BSE examine the syllabus of class IX & X. (vi) BSE- Orissa syllabus has no provision of practical work and project work. (vii) Weightage given to Geography in curriculum in ICSE, CBSE and BSE - Orissa are 9.09 percent, 7.00 percent and 6.66 percent respectively. (viii) The central emphasis of NCERT and BSE- Orissa Geography syllabus is on the study of the Interaction of Man and Environment and its effect, ICSE syllabus concentrates on the map work and BSE- Orissa on conceptual clarity of Geography phenomena. (ix) BSE - Orissa curriculum is centered around cognitive aspect, NCERT syllabus on applicability and ICSE on development of Geographical skills. (x) Geography text-books presented by BSE Orissa are not written according to the objectives of teaching Geography. Do not help in developing skill in map work. They require improvement in aspects of papers, finding, get up, illustrations, colored maps, work sheets and guideline for teacher. (xi) Only 3.94 percent of teachers teaching Geography had Geography at graduation level. (xii) Majority of schools in Orissa did not have a properly qualified and trained Geography teacher. (xiii) Only 42.62 percent of Geography teachers had gone in-service training in Geography. (xiv) No school of the state possessed the required quality of audio-visual aids. (xv) 15 schools did not possess a single map or chart to teach Geography. Overall situation of instructional materials required for teaching Geography in schools was very dismal. (xvi) Excursion method, field trip method are not used in teaching Geography. Teachers rarely used cut-out maps, drew maps on black board, used hand-drawn maps. They occasionally used printed maps. (xvii) Geography teachers were interested to complete their courses and examination oriented. No activities related to

geographical co-curricular activities were organized in schools. (xviii) A wide gulf was observed between the objectives of teaching Geography and questions set in HSC examinations and text-book exercise items. (xix) Gross deviations from standard principles of test construction were noticed in the Geography questions papers of HSC examinations. (xx) Central valuation system beset with a number of defects like hurried evaluation and evaluation by incompetent teachers and scope of favoritism.

Helenjoy and Shaiju (2004), conducted a study on “Development of Computer Assisted Teaching Material in History at Higher Secondary Level and its effectiveness.” The objectives were (i) To develop computer assisted lesson on the topic - UNO in History at higher secondary level. (ii) To test the effectiveness of the Computer Assisted teaching and lecture method of the lesson on the topic - UNO in History at higher secondary level and (iii) To verify the impact of gender, domicile and type of school on the effectiveness of computer assisted teaching method. 162 XI standard students from 3 higher secondary schools of Thiruvananthapuram district randomly selected. A pre and posttest design was used. Investigator made computer assisted lesson on the topic UNO and achievement test in History for higher secondary students were used for data collections. Mean, S.D. and t- test of significance were used for data analyses. Findings revealed while both the methods led effective learning, the CAT method was found superior to the lecture method. It is interesting to note that there is no gender difference in the scores obtained.

Kumar (2003), conducted “A comparative study of the Effectiveness of Mastery Learning Model and Memory Model on Students’ Achievement in Geography and their Self- Concept.” The objectives were (i) To compare the mean scores on the criterion achievement test in Geography of the three groups of students to be taught Geography with the use of Mastery Learning Model (MLM), Memory Model (MM) and Conventional Method (CM) of teaching before the experimental treatment. (ii) To compare the mean scores on the criterion achievement test in Geography of the three groups of students to be taught Geography with the use of MLM, MM and CM of teaching after the experimental treatment. (iii) To compare the mean gain scores on the criterion achievement test in Geography of the three groups of students to be taught Geography with the use of MLM, MM and CM of teaching after the experimental treatment. (iv) To compare the mean Self -concept scores of the three

groups of students to be taught Geography with the use of MLM, MM and CM of teaching, before the experimental treatment. (v) To compare the mean Self -concept scores of the three groups of students to be taught Geography with the use of MLM, MM and CM of teaching after the experimental treatment. (vi) To compare the mean gain scores on the test of self concept of the three groups of students to be taught Geography with the use of MLM, MM and CM of teaching after the experimental treatment. The sample consisted of 120 students studying in three sections of the IX class of K. M. Public Senior Secondary School, Bhiwani. The tools used were researcher made Geography achievement test, Self -concept test developed by R.K. Saraswat, Cattell's Culture Fair Intelligence Test developed by Cattell & Cattell and Socio-economic Status Scale Form A (Urban) developed by Dr. S. P. Kulshreshtha. The data were analysed with ANOVA followed by t- test. The findings revealed that (i) The group of students taught Geography through MLM scored significantly higher on the criterion achievement test than the group of students taught Geography through MM and even through CM. (ii) The group of students taught Geography through MLM scored significantly higher gain on the criterion achievement test than the group of students taught Geography through CM and MM. (iii) The group of students taught Geography through MLM scored significantly higher gain on the criterion achievement test than the group of students taught Geography through CM and MM. (iv) The group of students taught Geography through MLM scored significantly higher on the test of self-concept than the group of students taught Geography through MM and also more than the group of students taught Geography through CM. (v) The group of students taught Geography through MLM scored significantly higher gain on the test of self -concept than the group of students taught Geography through MM and CM. MLM was superior to MM and MM was found superior than the CM.

Mary (2004), conducted a study on "The effect of Information Processing Models in the Teaching of Geography in the Secondary Schools of Kerala." The objectives were (i) To find out the effectiveness of Information Processing Models (IPM) of Teaching and to compare it with the Conventional Method (CM) on the achievement of pupils in Geography. (ii) To find out if there is any significant difference in the immediate and delayed achievement of pupils in Geography when they are taught through the IPM's. (iii) To compare the effectiveness of three separate model categories belonging to the information processing family and that of the conventional teaching-

learning method on the achievement in Geography. (iv) To estimate the main and interaction effect of each independent variable and independent variable with special reference to the extraneous variables and basal variables, such as, intelligence, attitude, learning environment, socio-economic status, gender, locality and type of management of schools on the dependent variable. It was an experimental study with non-equivalent pretest posttest control group design adopted. Stratified random sampling technique was used. 640 students from Standard IX with 160 students each in the three experimental groups and 160 students in the control group were the sample. The tools used were the lesson transcripts for teaching Geography through the IPM's and CM, Standardized tests of Geography, Kerala non-verbal group test of intelligence, Attitude towards Geography learning scale, Geography learning environment questionnaire, Socio-economic status scale and Personal data sheet. Paired samples t-test and ANCOVA were used for analyzing the data. The findings were (i) IPM is more effective than the conventional teaching method in learning Geography in the secondary schools with special reference to the intelligence, attitude towards Geography learning, Geography learning environment and socio-economic Status of the students and with special reference to the combined influence of model categories, region and gender with pretest, intelligence, attitude towards Geography learning, Geography learning environment and socio-economic status of the students as covariates. (ii) Among the three model categories belonging to the IPM family, advance organizer model is found more effective than the other two models.

Kohli (2005), conducted a study on "Efficacy of Computer Assisted, Concept Attainment Models on Students' Achievement in Environmental Science, Self-Concept and Emotional Intelligence." The objective was to compare the mean gain achievement scores, self-concept scores and emotional intelligence scores with the help of computer assisted model and concept attainment model before and after the experimental treatment. The sample consisted of 80 students of class V from two private schools. Two intact sections were selected from each school after matching them on intelligence & SES as the experimental group and the control group. Pre-test and Post-test control group design was employed. Experimental group was taught through computer assisted model and concept attainment model whereas control group by conventional method. The tools used were Environmental Science Achievement Test by Bineeta, Children Self-concept Scale by Ahluwalia, and

Emotional Intelligence Test by Sarabjit and Khera. The data were analyzed with the help of t-test. The findings revealed that (i) Computer assisted model and concept attainment model both were found to be effective in improving the achievement level of students and changed the aptitude and interest of the students. Unlike conventional method, students got feedback and remedial teaching which automatically improved their achievement and promoted their self-concept. (ii) Computer assisted model and concept attainment model was shown to be very effective in enhancing the emotional intelligence of the students.

Deshmukh (2006), conducted a study on “Effectiveness of 6th class Geography Teaching with the help of Memory Training Model by using teaching aids.” The objectives were (i) To develop learning efficiency and progress in examination in experimental group by using Memory Training Model (MTM) with the help of teaching aids. (ii) To compare experimental and control groups on the basis of study skills and progress in examination due to use of MTM and on the basis of knowledge and understanding as objectives of classroom teaching. (iii) To study the difference between achievement and skills as objectives of classroom teaching of experimental and control groups. (iv) To develop self-learning instructional material based on MTM. (v) To develop effectiveness in teaching by using self-analysis as skill of MTM. (vi) To study the learning efficiency and progress in examination of experimental group and to know the probable difference between learning efficiency and progress in education of control group and experimental group using MTM when level of education in family, socio-economic status, achievement in 5th standard, age and sex of both the groups is same. (vii) To study comparative effectiveness of traditional teaching and experimental teaching. The study was experimental in nature. Pretest posttest control group design was employed. The tools used were tests, interviews, self-learning instructional material and evaluation tools developed by investigator. Sample consisted of 60 students studying in Prathmic Vidya Mandir and Sanskar Kendra, Shrirampur during 1998-1999 session. The data was analyzed by using analysis of gain scores, paired sample t-test, t-test, mean and percentages. The findings revealed that (i) There was significant progress in experimental group by using MTM in final examination in comparison to first and second session test. There was also significant progress in learning efficiency in Geography by using MTM. (ii) There was significant progress in experimental group in comparison to control group

in first and second session test and final examination and learning efficiency in Geography and even in last interview and practical examination. (iii) There was significant change in experimental group's knowledge and understanding by using MTM. Also there was significant progress in final examination in comparison to first and second session test. (iv) There was significant progress in experimental group's achievement and skills due to MTM. Also there was significant progress in final examination in comparison to first and second session test. (v) Teaching was found to be effective with the use of MTM in comparison to traditional teaching. (vi) The achievement of experimental group in final examination was significantly high in comparison to first and second session test when the socio-economic status of experimental and control groups was same. (vii) The progress of experimental group in examination was significantly higher in comparison to control group when socio-economic status of both the groups was same. (viii) The learning efficiency level of experimental group students of Geography was improved. Some students attained good level, some attained very good and maximum get the mastery level.

Babi (2006), conducted a study on "Effectiveness of Teaching methods based on Puppet-show and its Videography for the Teaching of Language and History." The objectives were (i) To prepare puppet-shows for the selected units of Hindi and History of the syllabus of standard nine. (ii) To prepare the video lessons based on the videography of puppet-shows of the selected units of standard nine. (iii) To study the effectiveness of the teaching method based on the puppet-show with reference to the traditional method of teaching for the achievement of students learning. (iv) To study the effectiveness of the video lesson based on the videography of puppet-show with reference to the traditional method of teaching for the achievement of students learning. (v) To study the effectiveness of the teaching method based on the puppet-show with reference to the video lesson based on the videography of puppet-show for the achievement of students learning. Through purposive sampling method 121 girl students studying in a Gujarati medium school of Jetpur city and Rajkot district were selected in the sample for the experiment. For both experimental groups the samples were 39 and 40 while for the control group it was 42. Three equal groups, Post-test Experimental Design were selected. It was counter balanced rotated group design, with groups equal on the basis of students' achievement in 8th standard final examination. The tool used was teacher made tests of selected five units of Hindi and

History each as post-test prepared by the investigator using norm reference testing procedure. The data analyses tools were ANOVA followed by t-test after testing the equalization of three groups. The findings revealed that (i) Video lessons based on videography of puppet-show were more effective than the methods based on puppet-show and traditional model. The method based on puppet show was more effective than the traditional method for the Achievement of girl students' learning. (ii) The retention for the three units out of five was found for the subjects Hindi and History and the result was same for selected all the three methods of teaching.

2.1.2 Researches Conducted in India on Computer Based Multimedia Package and /or CAI for Teaching-Learning

Total twenty two studies were found and analysed in the of Computer Based Multimedia Package and /or CAI for Teaching-Learning

Basu (1981), conducted a study on the "The Effectiveness of Multimedia Programmed Materials in the Teaching of Physics." The objectives were (i) To develop instructional materials for the strategy of programmed class-teaching and to study its effectiveness. (ii) To develop a multimedia programme package using each style of programme viz., semi-programme, linear programme, branching programme, and hybrid programme, in conjunction with audio-visual media. (iii) To compare the relative effectiveness of different strategies of instruction employing multimedia programmed material and programmed class-teaching on the criteria of immediate achievement, retention and delayed retention, and (iv) To study the interaction effects of instructional strategies, abilities and occasions (immediate learning, retention and delayed retention). The sample consisted of 400 learners of standard IX. The tools used were a group test of intelligence B.E.P.R.T in Bengali, the entry level tests, and criterion referenced Tests I, II and III. Five treatment groups were T-1 having programmed lessons, teachers' resource book and guide, students' study guide for classroom demonstration; T-2 having a semi-programmed text, tape-slide work-book, tape-transparency, auto- elucidation test, tape-filmstrip, tape-film, physics-kit, manual for performing experiments; T-3 with a linear programmed 'text, tape-slide work-book, tape-transparency, auto-elucidation test, tape-filmstrip, tape-film, physics-kit, manual; T-4 having a branching programmed text, tape-slide work-book, tape-transparency, auto-elucidation test, tape-filmstrip, tape-film, physics-kit, manual; T-5

having a hybrid programmed text, tape-slide work-book, tape-transparency, auto-elucidation test, tape-filmstrip, tape-film, physics-kit, manual. The data analyses tools were ANCOVA and 5X3X3 factorial experiment with nesting and crossing. Findings revealed a significant difference among the different strategy means-on the criterion on overall achievement the multimedia semi-programmed instruction was better than the strategy of programmed teaching; the multimedia linear programmed instruction was better than the multimedia semi-programmed instruction; the multimedia branching programmed instruction was better than the multimedia linear programmed instruction; and the multimedia hybrid programmed instruction was better than the multimedia branching programmed instruction. The strategies of multimedia programmed instruction enabled learners to reach the level of mastery learning.

Kumar (1981), conducted "An experimental study of the relative effectiveness of three methods of instructions i.e. Exposition method Programmed Learning method and Multi Media Method in Science Education." The objectives were (i) To find out the relative effectiveness of the three methods of Instruction exposition method programmed learning method and multimedia method. (ii) To develop multi-media text on the programmed content. Method of study employed was experimental and a 3 x 2 factorial designs was adopted. Sample for the study were 180 students. Findings revealed that the multimedia method was more effective than either the P.L.M. & Exposition method. There was no interaction between the three methods of interaction and the two levels of intelligence. (*Buch M.B.,P,633*)

Ravindranath (1982), conducted a study entitled "Development of Multimedia Instructional Strategy for teaching Science (Biology) at Secondary School Level." The objectives were (i) To develop a duly validated multimedia instructional strategy for VIII standard level. (ii) To study the relationship between students achievement and their intelligence. (iii) To study the feasibility of the strategy in terms of (a) time (b) cost. It was an Experimental study. Sample selected were 90 students studying in Std. VIII. Tool adopted was Pretest-Post test design. Findings revealed that there was positive and significant correlation between intelligence and achievement through the strategy. The study resulted in the development of a duly validated multimedia instructional strategy that found to be feasible if it is to be regularized in a school. Besides, the study has also paved the way for structuring alternative approaches of

instruction within the strategy through the results obtained in respect of the relationship between student's achievement through the strategy and their intelligence and also through the experiment with the alternative instructional output.

Krishnan (1983), conducted a study entitled "Development of Multimedia Package for Teaching a Course on Audio- Visual Education." for the instructor training programme where the researcher tried to find the effectiveness of the multimedia package in terms of achievement of trainees and change in attitude of the instructor trainees towards the multimedia package, and tried to study the feasibility of the multimedia package in terms of time and cost. A single group design was evolved. The instructional strategy was prepared in modular form having programmed slides, programmed instructional materials, non-projected visual aids, self-instructional materials with a manual for practical exercises, self-evaluating unit tests with answer keys, discussions, feedback, etc. as its components. The strategy was implemented for one academic session. The tools used for data collection were criterion tests, comprehensive course tests and an attitude scale prepared by the investigator, and an English language ability test designed at the matriculation level. The findings were (i) 98 per cent of the trainees obtained more than 80 per cent of the marks on the final post-test. (ii) The mean percentage of the post-test scores varied from 81.41 to 90.46. (iii) The mean gain in the total scores for all the modules was found to be significant at 0.01 level. (iv) The mean gain scores of knowledge, comprehension and higher mental abilities, attitude change, achievement of the trainees and their language ability were found to be positively related and significant at 0.01 level. (v) The feasibility of the multimedia package was established in terms of cost involved in reproduction of the various resource materials and the time scheduling in an actual institutional set-up. The study was found to be quite effective.

Vardhini (1983), conducted a study entitled "Development of a Multimedia Instructional Strategy for Teaching Science (Physics and Chemistry) at Secondary Level." The objectives were (i) to develop a validated multimedia instructional strategy for teaching science (Physics and Chemistry) in Standard VIII, (ii) to study the relationship between achievement using the strategy and intelligence and scientific attitude, (iii) to develop alternative instructional inputs and study their effectiveness, and (iv) to study the feasibility of the strategy in terms of time and cost. The

instructional strategy was validated on a single group of 45 students of class VIII of an English medium school of Baroda City. The control group consisted of 47 students of another section of the same grade who were not exposed to the strategy. The inputs of the strategy were introduction, lecture, discussion sequence, discussion, guided discovery, audio-visual and biographical accounts, summaries, glossary, diagrams, exercises and assignments, criterion tests and feedback. Criterion test and comprehensive tests, scientific attitude scale, a reaction scale prepared by the investigator, Madhooker Patel's Intelligence Test, the examinations conducted by the school were the instruments used. Descriptive statistical techniques and the t-test were used for analysis and hypothesis testing. The findings revealed (i) Almost, all the units indicated average/high level of performance on the total test. (ii) The strategy was found valid against the criterion of scientific attitude in that significantly higher performance was noted for the group in the posttest over the pretest. (iii) Validity of the strategy was established from reactions expressed by students for its continuance and also their improvement in science achievement. (iv) Intelligence and achievement using the strategy presented a significant relationship. (v) A significant relationship was found between scientific attitude and achievement for the experimental group and control group. (vi) Visual projections with teacher explanation and those with taped commentary were equally effective in terms of achievement. (vii) Programmed material and discussion sequence were equally effective on the total test. (viii) The strategy was found feasible when seen in terms of its reproducibility and the cost management by individual schools. The educational implication of the study is that for achievement of different instructional objectives, a systematically validated multimedia strategy can be implemented at school level with suitable cost and time components.

Kothari (1985), conducted a study entitled "An Investigation into Efficacy of Different Instructional Media in the Teaching of Mathematics to the Pupils of Class IX in Relation to Certain Variables" with respect to media I (visual projection), Instructional Media II (activities and experiment), Media III Programmed Learning Material and media IV Traditional method of teaching, in terms of achievement. Factorization of the type $a^2 - b^2$ and expansion of $(a + b)^2$ were selected for preparing transparencies for projection through the overhead projector. The same topic was selected for the preparation of materials for activities and experiments as well as for

preparing programmed learning material. The criterion tests on both units were prepared. The pretest post-test control group design was adopted for the purpose of studying the efficacy of different media. The experiment was carried out in two schools. Four groups of class IX pupils having 30 pupils in each group were selected for implementing the instructional media while the other four groups were treated as control groups. The junior index of motivation (JIM Scale) and test of reasoning ability were used for collecting necessary information about the variables. The analysis of covariance was used to draw conclusions. Some of the major findings of the study were (i) Visual projection and activities and experiment were equally effective for Unit I while visual projection was superior to the activities and experiment approach for Unit II. (ii) Visual projection was superior to programmed learning material for Unit I, while they were equally effective for Unit II. (iii) The approach of media activities and experiment was superior to programmed learning material for Unit I but they were equally effective for Unit II. (iv) Visual projection was superior to the traditional method of teaching for Units I and II. (v) The activities and experiment approach and the traditional method were equally effective for both units. (vi) Programmed learning material and the traditional method of teaching were equally effective for Units I and II. (vii) The results clearly indicated that the instructional media I, namely visual projection, was comparatively more effective than any other media like activities and experiment or even programmed learning material. The low achievers were comparatively more benefited by programmed learning material than the high and average achievers. In short the findings clearly indicated that the instructional media I, namely visual projection, was comparatively more effective than any other media like activities and experiment or even programmed learning material.

Jeyamani (1991), conducted a research on "Effectiveness of the simulation model of teaching through Computer Assisted Instruction (CAI)." The objectives were (i) To find the effectiveness of the simulation model of teaching as compared to the traditional method (ii) To utilize the growing use of computer in education. Method of study was experimental in nature. Researcher developed a Computer Assisted Instruction (CAI) package in Physics for class XI students. The sample for the investigation consisted students of standard XI of the two schools selected. The pre-test post-test method used. Mean standard, deviation and t-test were used to treat the

data. Findings revealed that (i) Experimental group obtained a higher mean than the control group. (ii) The sex wise comparison provides to be insignificant. (iii) There was no significant difference in learning level between Tamil medium and English medium students. (iv) The experimental group performed significantly better than the control group. (M.Phil)

Singh, Ahluwalia, and Verma (1991), conducted a research on “Teaching of Mathematics: Effectiveness of Computer Assisted Instruction (CAI) and Conventional method of Instruction”. The objectives were (i) To study the difference in Mathematics achievement that occurs as a result of the difference in instructional strategy among boys and girls separately and as a group. (ii) To study the direction of change in attitudes of male and female students separately and as a group towards Mathematics as a result of two different instructional strategies. The sample consisted of 220 students from four selected higher secondary schools, covering the good, average and poor schools of the Bhilai steel plant, Bhilai (M.P.). Findings revealed that (i) The students who used the computer scored significantly higher than those taught Mathematics through the conventional method. (ii) The students who used the computer showed significantly highly favorable attitude towards mathematics than those who did not use the computer (iii) Achievement in Mathematics and change in attitude towards Mathematics were found to be independent of the sex factor.

Rose (1992), conducted a research on “Effectiveness of the Computer Assisted Instruction with special reference to under achievers”. The objectives were (i) To develop CAI software (ii) To find out the effectiveness of CAI with TSS and CAI with reference to the learner variable viz. sex, locale, IQ and achievement level and (iii) To find out the interaction of the learner variables and the treatment on the achievement score. The randomized block design was followed in the selection of the sample, with IQ as the blocking variable. The sample consisted of three group of size 32 each having students of standard IX selected from three Tamil Nadu State Board schools covering one rural and two urban. The underachievers were identified by regression analysis. The tools included CAI software, achievement test, cultural fair, intelligence test by Cattell and Cattell, study habits inventory by Patel and Mathematics study attitude scale by Sundarajan. Mean, S.D., t-test, chi-square, one way and two-way ANOVA were used to treat the collected data. Findings revealed

that (i) Both the CAI strategies were superior to the traditional method of instruction and CAI with TSS was more effective than CAI without TSS for underachievers (UA). (ii) Except achievement level, all the other learner variables combined with the treatment had no interaction effect on the achievement score. (iii) There was no relationship between the post treatment scores and the variable 'sex', 'locale' and 'achievement level' of the experimental group. In the case of the variables IQ, study habits and Maths study attitude, the positive relationship between those variable and achievement at the pre-treatment level was found to be cancelled at the post test. Similar results were obtained for underachievers.

Prabhakar (1995), conducted a research on "Development of Software for Computer Aided Instruction and its comparison with Tradition method for Teaching Physics at Plus II level." The major objectives were (i) To develop computer software for computer aided instruction for teaching selected topics in physics, namely, 'semiconductors', 'P-N Junctions' and 'Electro-Magnetic Induction'. (ii) To study the effectiveness of CAI material in terms of achievement and reaction towards CAI material, with further sub objectives. The study was experimental and pretest-posttest control group design was used. Sample comprised 203 students of class XI and XII of Indore city school with CBSE syllabus. The tools used were the 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, reaction scale. Data analyses tools were percentile, mean, correlated t-test, coefficient of variance, chi-square test, ANOVA and ANCOVA. The findings revealed that (i) The CAI material was found to be effective in terms of achievement and reaction towards CAI material of both class XI and XII students. (ii) When moderate variables were considered as covariates separately- The CAI was found to be significantly superior to traditional method in terms of achievement of class XII students (iii) CAI was found to be equally beneficial to both males and females of class XI and XII in terms of achievement when moderate variables were considered as covariates separately. (iv) Class XI students were found to be have significantly more favorable reaction towards CAI material than class XII students. (v) Class XI and class XII males as well as females were found to have equally favorable reaction towards CAI material (vi) The achievement was found to

be independent of personality as well as interaction between treatment and personality. (vii) 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. (viii) The study habits as well as interaction between treatment and study habits were not found to influence significantly the achievement of students.

Khirwadkar (1998), conducted a study on “Developing a Computer Software for Learning Chemistry at Standard IX studying GSEB Syllabus.” The objectives were to study the effectiveness of the multimedia package in the terms of instructional time and achievement of students, its effect on students achievement in relation to students intelligence level, motivation level, attitude towards the package, effectiveness of the CAI with regard to aspects of the package such as content of package , preservation, examples and illustrations, graphs, figures, maps, evaluation items, utility of package i.e. utility of software and instructions given in the instructional manual. Sample taken was one of the English medium schools of Baroda City for implementing the developed software. One section of Standard XI Science was taken and thirty students were selected randomly as sample for the experimental group and rest of the students of the section constituted the control group. A pre-test post-test experimental and control group design was employed. Tools and Techniques employed were the software developed by the investigator as treatment tool and Achievement test constructed by the investigator was used as a testing tool. The data were analysed through ANOVA, ANCOVA and content analysis. Findings revealed that the experimental group achieved significantly higher than the control group. CAI was time effective. The students and teachers were found to have favourable opinion towards the software package. The developed software package was found to be effective in terms of academic achievement of the students. Learning through software was more interesting due to the presence of graphs and figures, in software. Learning becomes more quick and clear with regard to understanding of some basic concepts. It helps in reducing instruction time. It was found that the academic achievement of students of experimental group was very much positively affected by the variable like IQ, academic motivation and attitude. CAI was found to be effective mode of instruction and increased their enthusiasm for the study of the chemistry.

Nalayini (1998), conducted a research on “Development and Validation of Computer Assisted Instruction in Physics for High School Students.” The objectives were (i) To develop suitable software on the selected topic “Electricity” for class IX and validate it. (ii) To study the effect of computer assisted instruction on learning the concepts in the topic “Electricity” in physics. (iii) To analyze the variation among the students in the acquisition of various cognitive skills by learning through computer assisted instruction. (iv) To study the relationship between achievements in physics learnt through computer assisted instruction and intelligence of the students. (v) To find out the relation between students’ attitude towards science and their achievement in learning through computer assisted instruction. Quasi-experimental design was adopted. 200 students of IX standard were the samples. Tools used were Investigator made computer programming on the topic “Electricity”; Culture fair test scale 2 published by institute for personality and ability testing; Science attitude scale; Interim test and achievement test prepared by the investigator. The data were analyzed with the help of t-test and correlation technique. The findings revealed that (i) The achievement in the posttest of the experimental group is higher as compared to control group. (ii) The experimental group differs significantly when compared to control group. Hence learning through computers helped in achieving better than the control group. (iii) 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. (iv) 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. (v) 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. (vi) There is no significant relationship between achievements of students learning through computer assisted instruction and their intelligence. (vii) There is no significant difference between the attitude towards science that learns through computer assisted instruction and through traditional method.

Zyoud (1999), conducted an experimental study with the objective of the “Development of Computer Assisted English Language teaching program for VIII standard students” and to study its effectiveness on students achievement in terms of

vocabulary, grammar and comprehension with respect to their intelligence, motivation and attitude. BASICA computer programming language was used for developing software. Random sampling technique was used for control and experimental group. Tools used were achievement test, JIM scale and Raveni's progressive matrices. The findings of the study revealed that the developed package helped the students in vocabulary and grammar, whereas no effect in comprehension. Students were found to have positive attitude towards the package.

Shinde (2002), studied the "Effectiveness of Multimedia CAI Package with Reference to Levels of Interactivity and Learning Style." The objectives were (i) To prepare multi-media CAI packages with two levels of interactivity viz. high and low. (ii) To test effectiveness of the prepared CAI packages. (iii) To find out the extent to which scholastic achievement of the learner is affected by the levels of interactivity. (iv) To find out the extent to which scholastic achievement of the learners is affected by the learning style in two different environments (learning through CAI with high level of interactivity (HCAI) and learning through CAI with low level of interactivity (LCAI). The study was experimental in nature. Through stratified random sampling method, 87 pre-service teacher-trainees from colleges of education learning through English medium or graduated through English medium were selected as the sample. The tools used were Koeb's learning style inventory, Nafde's Non-Verbal Test of Intelligence (NVTI), Researcher made Pretest and Post-test on "Communication", opinionnaires, and a rating scale. ANCOVA and t-test was used for data analyses. The findings revealed that (i) HCAI was effective in terms of achievement. (ii) LCAI can also bring significant increase in the achievement scores. (iii) The two sample groups are not significantly different and are selected from the same population. (iv) Interactivity plays major role in enhancing the achievement of the learners learning through CAI. (va) Diverges and converges show significantly higher performance than Assimilators while learning through HCAI. Accommodators are also found performing better than Assimilators through not significantly. (vb) The diverges and accommodators find to learn with non-interactive mode. (vi) Most of the learners appreciated multimedia inputs in the CAI packages. (vii) CAI mode is considered to be an effective and efficient mode of learning.

Bhutak (2004), conducted a study on the “Development and Effectiveness of Multimedia Package for Science Subject of Standard 9.” The objectives were (i) To develop a multimedia package for subject science of standard IX. The multi-media package was in three parts, (a) Learning by power point slide show, (b) Self study material and (c) Learning by transparencies through over head projector. (ii) To study the effectiveness of multimedia package with reference to achievement test in science and retention of the material of science. The research was designed on ‘Two groups randomized subjects only post-test 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 post-test 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 revealed that (i) 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. (ii) Self-study material was more effective than slide show for girls, while slide show proved more effective than self-study material for boys. (iii) Slide show and self-study material were almost equally effective for girls and boys jointly.

Desai (2004), conducted “A Comparative Study of the Efficacy of Teaching Through the Traditional Method and the Multimedia Approach in the subject of Home Science.” The objectives were (i) To develop a multimedia package for teaching the subject of nutrition (Protein) to the undergraduate level students of Home Science (ii) To find out its effectiveness in terms of achievement of the students, and of the lecture method and practical method used in the teaching of Home Science. (iii) To compare the achievement of the student’s learning through the multimedia approach and the traditional way of teaching. (iv) To study the effect of caste’s, of location, of income and of achievement at the Std. XII examination, of intelligence, on the acquisition of knowledge through traditional teaching methods (v) To study the opinions of students about learning through multimedia approach. It was an experimental study with experimental group and control group design. The samples were B.A. first year home science 98 students. Tools used were investigator made multimedia package (transparencies, pie graph, charts, diagrams, pictures, video tape, audio tape, and slide

set), pre-test, post-test, retention test and opinionnaires, intelligence test by Dr. K.G. Desai. The t-test and f-test were employed for data analysis. Findings revealed that the mean achievement of the experimental group was found significantly higher than that of the control group. From post-test to retention test almost equal reduction in performance was found in both the groups. The students were found to have favourable opinions towards the multimedia approach and found the relative efficacy of teaching through the traditional method and the multimedia approach in the subject of Home Science, particularly, Proteins.

Singh (2005), conducted a research on “Effectiveness of Computer Assisted Instruction for teaching Biology.” The objective was to compare the effectiveness of Computer Assisted Instruction (CAI) as against lecture method on the topics ‘Tissues and cell’. Experimental method was adopted. Pre test, post test, experimental group and control group design was used. The sample selected 28 students (14 in control group and 14 in experimental group) of class IX by random sampling from the student studying in Ramanujan Public School. An achievement test was constructed to measure students’ learning about cell and tissues. Students were taught cell and tissues by lecture method. Through CAI, CD-Rom for science standard class IX was used for teaching. Mean, S.D. and t-ratio were calculated to analyze the data. Findings revealed that (i) Both the methods were effective in enhancing the learning about cell and tissues. (ii) While lecture method was more effective than CAI for the teaching cell, CAI was more effective then lecture method for teaching tissues.

Dange and Wahb (2006), conducted a study on Effectiveness of Computer Assisted Instruction on the Academic achievement of Class IX Student’s Physical Science.” The objectives were (i) To find out the effectiveness of teaching Physics for class IX through conventional method; (ii) To find out the effectiveness of teaching Physics for class IX through computer assisted instruction. (iii) To find out the effectiveness of teaching Physics for Class IX through computer assisted instruction package of “Universe”. The study was experimental in nature and involved a parallel or equated group experimentation which was more complete and accurate than the one group experimentation. The sample of 32 students was divided into two equated groups of 16 students each. The control group of another 16 students was taught the same content by conventional method. Mean, standard deviation and t test were computed

the data for finding results. Findings revealed that (i) There were no significant difference between mean gain scores of experimental and control group of pre test. (ii) There was no significant difference between mean gain scores of pretest and posttest of control group. (iii) There was significant difference between mean gain scores of pretest and posttest of experimental group. (iv) There was significant difference between mean gain scores of posttest of control and experimental group.

Hirani (2007), conducted a study entitled “Development and Try-out of Computer Based Multimedia Package for Instruction in Gujarati Language.” The objectives were (i) 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. (ii) To try-out the effectiveness of the package in the context of the academic achievement of the students. (iii) To study students’ reactions towards learning through the package. The research was of experimental type. The experiment was conducted by ‘two groups randomized subjects only post-test 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 post-test. 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 revealed that (i) Students of computer aided multimedia package group scored significantly higher on posttest than the students of traditional method group. (ii) Students opined favourably for learning through computer aided multimedia package.

Vellaisamy (2007), conducted a study on “Effectiveness of multimedia approach in teaching science at upper primary level.” The objectives were (i) To find the status of learning achievement in science among upper primary pupils. (ii) To study the effectiveness of multimedia elements such as audio text, images, sound, animation, graphics and video, and multi-media materials such as projected media, non-projected media, print media and mass media on learning achievement. (iii) To examine the scientific attitude of pupils taught through multimedia. (iv) To establish relationship between scientific attitude and achievement in science of the learners. It was an experimental study. 520 pupils of class VIII from 13 schools were the sample. The investigator divided the control group into five sub-groups of 50 students each. The

experimental group was also divided into five sub-groups (four groups of 50 each and the last group of 70). The investigator developed and validated a scientific attitude inventory. The control group was taught through conventional method of teaching. The experimental group was taught through multimedia approach. Findings revealed that the pupils of the experimental group achieved more than the pupils of the control group in science at upper primary level. The pupils of the experimental group have improved than the pupils of the control group in their scientific attitude. This is due to the favourable impact of the multimedia approach in the learning of the VIII standard pupils.

Patel (2008), conducted a study entitled “Computer Assisted Instruction in Physics for the students of standard XI: An Experimental study”. The objectives were (i) To develop computer assisted instruction package on two units of physics for XI Science student studying GSTB syllabus. (ii) To study the effectiveness of the CAI package in terms of achievement of students of experimental group. (iii) To study the relative effectiveness of teaching Physics in terms of two methods of teaching Physics i.e. conventional method of instruction and CAI package for students of traditional group and experimental group. (iv) To study the relative effectiveness of CAI with reference to the sex of the students of the experimental group. (v) To know the opinions of the students of the experimental group regarding the effectiveness of used CAI in Physics. (vi) To know the opinions of the teachers of the experimental group regarding the effectiveness of used CAI in physics. Study was experimental in nature. Multistage sampling technique was used in the study. The pre-test post-test control group design was employed. Two schools, one in rural and another in urban area was selected to conduct the experiment. 30 students each in traditional and experimental groups were the samples. The tool used was an opinionnaire. Opinions of the expert and subject teacher were invited by an evaluation sheet. For the analysis and interpretation of the data the statistical technique such as mean, S.D., t -test and chi square test was employed. Findings revealed that (i) The study has resulted in the development of a CAI program on ‘motion in one dimension and two dimensions’ and ‘Laws of Motion’ for teaching Physics to the students of Class XI. (ii) The package was found significantly effective for the students of class XI of both the groups. (iii) Comparative effectiveness of the CAI method and the traditional method was measured by the experiment and CAI method was found more effective in terms

of achievement scores. (iv) In relative effectiveness of the package was equally effective in teaching boys and girls. (v) Students and teachers both revealed a favorable opinion towards CAI program.

Netragaonkar (2011), conducted a study on “Development of Computer Assisted Instruction Programme and its effectiveness to teach Chemistry to XI standard students.” The objectives were (i) To develop CAI programme for the selected units of Chemistry. (ii) To find out the effectiveness of CAI programme, over the conventional method of teaching Chemistry to XI standard students. I was experimental study with pre-test post-test equivalent group formed through purposive sampling. Programme was designed in java script, flash, java script animations, corel draw, graphics, and in Web page. The observations are (i) There is a significant difference between mean scores of control group and experimental group taught by conventional method and CAI programme respectively are accepted. The developed (CAI) programme for Chemistry subject was found significantly superior to conventional method in terms of academic achievement. (*International educational e-journal, volume-i, issue-i, oct-nov-dec 2011*)

2.1.3 Researches Conducted in India in Geography Related to Multimedia Package and / or CAI

Total three studies were found and analysed in the area of Teaching of Geography Related to Multimedia Package and/ or CAI

Nanavati (1981), conducted a study entitled “To Develop a Learning Package on Population Education and the Study its Effectiveness” a multi-media learning package on population education. The objectives were (i) To develop a multi-media package on population education, and (ii) To find out its effectiveness in terms of achievement. The investigator selected three schools-one each from a city, a town and a village. The multimedia package was tried on the pupils of standard IX In each school two groups matched in terms of age, sex, socioeconomic status, previous achievement scores and achievement scores on the special test on population education were formed for experimentation. The multimedia package under reference comprised a tape-recorded dialogue of three experts on population education, work books, three films (Danger Signal, Personal Hygiene, The Boat), and 18 slides, with relevant recorded commentary cassettes. The findings of the study were (i) The results

clearly indicated that the learning package was more effective than the traditional method in teaching the content of 'Population Education' to the pupils of Class IX (ii) The gain in respect of the city group was higher than the gain in the remaining two groups. (iii) Performance of the town pupils was the lowest amongst the three sub-groups.

Idayavani (1991), conducted a study on “Developing a video programme on weathering and work of rivers in physical Geography for higher secondary students.” The objective was to find out whether the higher secondary students improve their achievement after viewing the video programme. The study was experimental in nature. Findings revealed that the higher secondary students taught by the video method performed better than the student taught by the traditional lecture method.

Singh (1999), conducted a study on “Environmental Education through Video-instructional Package: An Exploration.” with the major objective of exploration into the effectiveness of a new medium of instruction on comprehension, attention and appeal and fulfillment of objectives. Study was a developmental cum experimental in nature with pre-test, post-test design. Sample consisted of 6 experimental groups, each with 40 students of standard IX Gujarati medium. Tools and Techniques incorporated video-instructional package that consisted of video-film and learner's hand book developed by the investigator. A multi-faceted approach was developed and used for evaluation of programme and developed evaluative tools included criterion tests, attention measures, expert's judgment and opinionnaire for the students. For data analysis and interpretation both the descriptive and quantitative statistics were used. 't'- test, 'F'- test and analysis of covariance were used. Findings revealed that (i) The study resulted in the development of a video instructional package on 'Environmental Pollution and Education'. (ii) The developed video-instructional film was found significantly effective in teaching topic to the students of experimental group and in motivating the students and sustaining the attention and found equally effective in teaching the topic to boys and girls and in imparting knowledge of the topic. (iii) The developed Learners' hand book was found effective in teaching the topic and found equally effective on the boys and girls of Surat-city. (iv) Video instructional package (VIP) proved to be effective in motivating the students and sustaining the attention on the part of the programme. (v) The developed VIP was not found equally effective in

teaching the topic to boys and girls of standard - IX of Surat (city and rural area) with boys learning better. (vi) Improvement was achieved after the treatment of the Video-instructional film. (vii) The developed Learners' hand book (LHB) for rural area was found effective in teaching the topic for the students of experimental group (Surat - rural) but was not found equally effective in teaching the topic to boys and girls of experimental group (viii) VIP was found effective in teaching the topic to the students of experimental group - VI of Surat -rural. (ix) All educational experts found the selected theme and the sequence of frames very appropriate. In spite of few limitations the VIP was evaluated by all the experts to be a laudable attempt in presenting environmental education for the students of Gujarati medium. (x) The majority of the students found the package knowledgeable, innovative, systematic and interesting. Most of the students of standard IX of Surat (city & rural) liked and enjoyed learning through VIP. A teacher made video-instructional packages can be used effectively for creating awareness and providing information to school students. It could be used as an instructional system in both formal as well as in non-formal situation. The study also recommends regarding the organization of the training programmes and work shop for teachers where development of software especially for video package can be learnt and made by the teachers.

2.1.4.0 Observations from the Researches Conducted in India

Studies in the area of teaching Geography, CAI or multimedia package in teaching-learning and in specific in Geography were thoroughly reviewed and following observation were made by the researcher for the studies conducted in India.

2.1.4.1 Observations of Researches from Indian Studies in the Area of Geography

- (i) The below mention studies were related to concepts, approaches and models of teaching Geography. D, Souza (1971) opined there is a great need to identify the different geographical concepts and then develop suitable learning experiences in teaching Geography and Ponkshe (1983) found in a study the concept oriented method more useful than the traditional method and concluded that the Geography syllabi for classes VII, VIII and IX of Maharashtra were not concept-oriented. Inadequacy was also observed regarding many other aspects of the syllabi. These studies represent a welcome trend towards a cognitive approach to the teaching of Geography. Patyal

(1977) in a study found the chapters in subject of Geography were not organized properly and technical words were not explained properly. Chakraborty (1978) in a study found discussion by using instructional material more effective than lecturing and question answering positively and conclusively. An interesting attempt was made by Bhattacharya (1984) and found the inductive teaching model group to be more effective in comparison to traditional teaching technique as well as the concept attainment model irrespective of the resource status of educational institutions. The study implied that training in utilization of the models of teaching should be introduced in teacher education programmes of the country. Kohli (2005) in a study found the computer assisted, concept attainment models to be effective on students' achievement compared to conventional method. Deshmukh (2006) in a study found mastery learning model to be more effective than memory model and conventional method. Mary (2004) in a study found information processing model (IPM) as an effective method than the conventional method for the teaching-learning of Geography in the secondary schools. Dhamija (1985) in a study found in specific for Geography that radio-vision approach was more effective in terms of the retention on knowledge, comprehension and total achievement scores and students involvement when compared with modular and conventional approach. Shahi (1989) in a study found that the inductive programme was effective than deductive programme and traditional teaching in Geography.

- (ii) Studies related to scenario of teaching position of Geography. Three of the studies viz. that of Kahn (1985), Patil (1985) and Jani (1987) dealt with the scenario of teaching position of Geography in different states and country, revealed that 50 percent of teachers were not qualified in the subject of Geography and without professional degree. Majority teachers were teaching Geography through lecture method and without the use of teaching aid. Teaching aid especially in Geography, were not satisfactory. Lack of attendance of teachers teaching Geography in refresher course or orientation programme. Curriculum required modifications in the light of modern developments in the subject. Lack of clarity of the teaching skills in the subject. Padhi (1998) analysed the content of the textbook and the curriculum respectively reflecting the situation with lack of application objectives

satisfied, lack of development of skill in map work, lack of Audio visual aids, lack of field trips, exam oriented pattern of teaching, untrained and professionally incompetent teachers.

- (iii) Studies based on syllabus analysis. Gote (1997) gave a positive conclusion about the review of Geography textbooks for standard 1 to 5 of Maharashtra board with except for unattractive pictures and lack of references in books for supplementary reading.
- (iv) Studies experimental in nature and based of teaching methodology. Chaudhary (1985) affirmed the effectiveness of the programmed material in inducing learning among the students and opined its effective use for classes IX and X without any fear of failure and with junior students too. In view of the dearth of effective Geography teachers, a careful preparation of programmed material on the difficult contents of Geography could be tried. Helenjoy and Shaiju (2004) revealed while both the methods led effective learning, the CAT method was found superior to the lecture method. Nanavati (1981) in his study found that the multimedia learning package for population education to the pupils of class IX was more effective than the traditional method. Babi (2006) in his study revealed video lessons based on videography of puppet-show for the teaching of language and History to be more effective than the methods based on puppet-show and traditional model.
- (v) Though notable attempts have been made by various researchers towards the research in the area of methodology towards teaching and their impact, only few studies the researcher could come across in the area of Geography referring to the implementation of multimedia package or CAI in teaching learning process which can have implication on the present study. Study of Nanavati (1981) and Singh (1999) can be considered as closely related to Geography being 'population education' and 'environment pollution and education' the content of Geography. The results clearly indicated that the learning package was more effective than the traditional method in teaching the content to the pupils and in motivating the students and sustaining the attention. Idayavani (1991) in a study found that the higher secondary students when taught by the video method on weathering and work of rivers in physical Geography performed better then the student taught by the traditional lecture method.

2.1.4.2 Observations of Researches from Indian Studies Related to CAI and /or Multimedia Package

After reviewing the educational research done in India related to the study, the researcher comprehends the types of research done concerning CAI and multimedia packages for education. Studies reflect that computers when used in the form of media for instruction (be in the form of computer aided instruction and/or a compact multimedia package) have proved to be giving positive effects in various aspects viz. achievement level, retention level, motivation level amongst students. These studies revealed that teaching-learning becomes more interesting, enjoyable and prolonged. This reflection can be summarized is as follows:

- (i) CAI's have proved as an effective approach and is found to be more effective and superior when compared with traditional method in various subjects. This can be perceived from the studies of Singh, Ahluwalia, and Verma (1991), Jeyamani (1991), Zyoud (1999), Rose (1992), Prabhakar (1995), Khirwadkar (1998), Nalayini (1998), Shinde (2002), Singh (2005), Kohli (2005), Dange and Wahb (2006), Vellaisamy (2007), Patel (2008), Netragaonkar (2011).
- (ii) The studies that the researcher has come across in the field of teaching Geography through CAI and/ or multimedia packages substantiates that teaching becomes more effective with their support . **Idayavani (1991)**
- (iii) Visual Projections are comparatively more effective than any other media like activities and experiment or even programmed learning material. Kothari (1985)
- (iv) Difficult concepts can be better learned through computers. Nalayini (1998).
- (v) The students of computer aided multimedia package group scored significantly higher on posttest than the students of traditional method group. Hirani (2007), Bhutak (2004), Vardhini (1983), Desai (2004). The strategies of multimedia programmed instructions enable the learner to reach the level of mastery. Basu (1981) There is positive and significant correlation between intelligence and achievement through multimedia instruction strategies. Ravindranath (1982).

- (vi) Video instructional packages and / or multimedia package are more effective in terms of achievement and retention of science for both the groups of girls and the boys separately and jointly. Bhutak (2004) and Krishnan (1983).
- (vii) Reviewing various studies the researcher found that most of this research studies were related and confined with topics and branches of Science, Mathematics, English, History at higher secondary as well as secondary level that further revealed that well planned and designed CAI and multimedia package are insightful and profound in learning. One study researcher could come across at M.Phil level in the field of teaching Geography through CAI and/ or multimedia packages that reveals the teaching becoming more effective with the support of above. Idayavani (1991).
- (viii) The studies reviewed substantiated that CAI or multimedia packages are well suitable and effective for varied nature of instruction be it population education Nanavati (1981), environmental education Singh (1999) or for academic achievement in any subject content, as well for different categories of students be it slow learners Rose (1992), Prabhakar (1995) Nalayini (1998) or fast learner Prabhakar (1995), or for any level of studies be it primary level Kohli (2005), Secondary level Zyoud (1999) and Bhutak (2004), Higher Secondary level Singh (2005) or College level Desai (2004). Even CAI is found to be effective in different mediums of teaching Jeyamani (1991), Hirani (2007) and Singh (1999).
- (ix) The students were found to have favourable opinions towards the multimedia approach. Desai (2004) Students opined favourably for learning through computer aided multimedia package. Hirani (2007).
- (x) In an analysis of attitude towards the use of CAI mostly all the students shows the favorable attitude toward the use of computer Singh; Ahluwalia, and Verma (1991), Khirwadkar (1998), Patel (2008), Multimedia approach improves scientific attitude amongst learner Vellaisamy (2007).
- (xi) Multimedia approach has favourable impact on learning. Vellaisamy (2007)
- (xii) Teachers too showed the positive attitude towards the use of computer as well as uses of CAI in teaching learning process. Students' teacher recognised the important role that computers play in today's society. Khirwadker (1998), Patel (2008).

- (xiii) Relative effectiveness in enhancing the learning was seen through both the methods i.e. CAI and lecture method on different topics, thereby opining the nature of the content matters. Singh (2005).
- (xiv) Video instructional package is effective in motivating the students and sustaining the attention. Singh (1999).
- (xv) In relative effectiveness, the CAI package was equally effective in teaching boys and girls. Patel (2008), Singh (1999).
- (xvi) Learning with computer assisted model and concept attainment model changed the aptitude and interest of the students. Kohli (2005).
- (xvii) For achievement of different instructional objectives, a systematically validated multimedia strategy can be implemented at school level with suitable cost and time components. Vardhini (1983).
- (xviii) Studies when imparted through multimedia package can be remembered for longer duration of time. Bhutak (2004).
- (xix) A teacher made video-instructional packages can be used effectively as an instructional system in both formal as well as in non-formal situation. Singh (1999).
- (xx) The study also recommends regarding the organization of the training programmes and work shop for teachers where development of software especially for video package can be learnt and made by the teachers. Singh (1999).
- (xxi) Multimedia packages are found feasible in terms of cost and time. Krishnan (1983) and Vardhini (1983).

2.2.0 REVIEW OF THE RELATED LITERATURE CONDUCTED ABROAD

2.2.1 Researches on Teaching Social Science and/ or Geography Conducted Abroad

Total six studies were found and analysed in the area of teaching Social Science and/ or Geography conducted abroad.

Gudmundsdotir & Shulman (1987), conducted a study examining the Pedagogical and Content Knowledge (PCK) of two Social Studies teachers: a novice and veteran teacher. A qualitative research methodology was adopted. Tools - interviews, tape recordings, field notes, and documents were used and information was collected

during a period of 12 months. Researchers pointed out that there was a special kind of difference between the novice and expert teacher and this was neither content knowledge nor pedagogy. They concluded that this was about pedagogical content knowledge of teachers that combine content, pedagogy, and learner characteristics in a unique way. (*Pedagogical Content Knowledge in Social Studies Scandinavian Journal of Educational Research* 31 pp 59-70)

Gaytan and Slate (2002), did a comprehensive literature review of primarily studies done in multimedia use in the classroom from year 1990 onwards. Study revealed that numbers of benefits of multimedia usage in the classroom were found including more engaging classroom environments; more effective ways of communicating information; enhanced student's development of ideas; increased student satisfaction and motivation levels, among others. (*Journal of Research on Technology in Education*, 35: 186-205.)

Heafner (2002), prepared the powerful methods for effective integration of technology in Secondary Social Sciences. The purpose was (i) To prepare powerful methods for effective integration of technology in Secondary Social Sciences. (ii) To identify the existing uses of technology in secondary Social Science classrooms and teachers perception of effective technology integration. (iii) To study teachers attitude towards technology and students attitude towards the same. The state wise study of technology use in secondary Social Studies was conducted using a survey method. The study identified existing uses of technology in secondary Social Science classrooms and teachers perception of effective technology integration. The study also aimed at teacher's attitude towards technology and student's attitude towards the same. The study shows that there are some key issues effecting technology integration with secondary social science classrooms the factors affecting use of technology were resources, constraints, support and skill. It also showed that the teacher's effect was a composite of teacher's experiential knowledge, belief and gender. (*Doctoral Dissertation : University of North California at Greens-boro Dissertation Abstract International No. AAT3060354*)

NAEP (2002), National Assessment of Educational Progress report card for Geography, surveyed students' academic performance. Findings revealed that the average scores for students in fourth and eighth grade have improved, when compared to the results from 1994, whereas those for students in twelfth grade have remained the same. National Assessment of Educational Progress further concluded that to strengthen students' understanding of concepts in Geography, digital technology appears to be one solution. Findings from national assessments and surveys give rise to the concern: despite recent improvement in Geography achievement, further engagement of Geography students in both lower- and higher-order thinking is an important goal for educators, researchers, and policy makers. (<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002485>)

Clark & Keller (2006), conducted a survey study to find out the ability of the students in field of Geography skills. It was found that many Americans lack the basic skills representative of Geography literacy. Results of a recent survey showed that only 60 percent of American respondents 18-24 years of age could locate Iraq. When questioned about local events, only 52 percent could locate Mississippi, a state directly affected by hurricane Katrina. Studies suggest an inability to make connections between concepts in Geography and other Social Studies disciplines.

Dal (2008), conducted a research with the aim "To examine the student's understanding of basic vocabulary and essential concepts in the area of Physical Geography." The research was conducted on over four hundred and fifty three students of Geography ranging from sixth grade of primary education to third year in college. The findings of this study indicated that although Geographical definitions and vocabulary are being taught continuously throughout the educational system the same terms are being wrongly identified by students, especially in lower class levels. This would suggest that although the terms are being taught in class there is limited conceptual gain experienced by the students and little or no connection made between the vocabulary and the meaning. (*Assessing student's acquisition of Basic Geographical Knowledge. Journal of International Research in Geographical and Environmental Education*, 17(2), 114-130)

2.2.2 Studies in the area of Computer Based Multimedia Package and / or CAI Conducted Abroad

Total twenty six studies were found and analysed in the area of computer based multimedia package and CAI conducted abroad.

Clark (1932), conducted a study “Sound Motion Pictures as an Aid in Classroom Teaching” where he compared sound films and lecture demonstration. Research looked at the comparison of sound and silent films and classroom lecture techniques in the college setting. Three sound films, radioactive substances, liquid air, and characteristics of sound were assessed. Findings revealed that three sound films, radioactive substances, liquid air, and characteristics of sound were found to be as effective as the lecture demonstrations given by regular class instructors, in tests designed to measure thinking and reasoning ability. Results suggested motion pictures with sound were as effective as the traditional lecture format. (*Clark, C. C. (1932). Sound Motion Pictures as an Aid in Classroom Teaching, Doctoral Thesis: New York University.*)

Rooze (1983), presented a paper “Integrating Computer Software into Social Studies Instruction.” This paper examined the use of the computer as a mediating device and explores its influence on the Social Studies curriculum. A variety of software uses were analyzed, including drill and practice, tutorials, computerized databases, and simulations. The possible effects these uses can have were examined in terms of two views of Social Studies education--the knowledge approach and the skills approach. It was concluded that the computer can revolutionize Social Studies because of the knowledge, skills, and values it can transmit, and that once choices are made as to which knowledge, skills, and values should be transmitted in Social Studies education, the computer can play a significant role in Social Studies instruction. (ED239586: ERIC database no) *Oert L. Banger-Drowns*

Kulik, Kulik, and Bangert-Drowns (1984), conducted a study assessing the “Effectiveness of Computer-Based Education in Elementary Schools.” The meta-analytic approach was used in this review. It required a reviewer (a) to locate studies of an issue through objective and replicable searches; (b) to code the studies for salient features; (c) to describe study outcomes on a common scale; and (d) to use statistical methods to relate study features to outcomes. The data bases searched for

Meta-analysis were (a) Comprehensive dissertation abstracts, and (b) ERIC, a data base on educational materials from the Educational Resources Information Center, consisting of two files, research in education and current index to journals in education. (c) Studies retrieved by branching from bibliographies in the documents located through reviews and computer searches. The major finding in a meta-analysis of 32 comparative studies showed that computer-based education has generally had positive effects on the achievement of elementary school pupils. These effects have been different, however, for programs of online computer-managed instruction (CMI) and for interactive computer-assisted instruction (CAI). The average effect in 28 studies of CAI programs was an increase in pupil achievement scores of 0.47 standard deviations, or from the 50th to the 68th percentile, i.e. CAI related instruction appeared to improve student achievement by 0.47 standard deviations, on average, over students receiving conventional instruction. The authors calculated that a typical student scoring in the 50th percentile with conventional instruction would score in the 68th percentile with CAI. The average effect in four studies of CMI programs, however, was an increase in scores of only 0.07 standard deviations. Study features were not significantly related to study outcomes. In meta-analysis of multimedia research, they concluded that a computer program can be erroneously perceived to affect student knowledge acquisition, when in fact it is the instructional method built into the program that affects knowledge acquisition. This research preceded the advent of the Internet as an instructional tool in education. (*Effectiveness of computer-based education in elementary schools. in Computers in Human Behavior, 1(1), 59-74*)

Rooze & Northrup (1985), Examined a variety of computer software uses and possible effects they can have on Social Studies instruction, using programs as mediating devices and tools. They concluded that the computer can assist implementation of essential objectives in the Social Studies curriculum. (*"Uses for the Computer in Implementing the Essential Elements of Social Studies."* EJ336762 .ERIC NO)

Northup & Rooze (1990), conducted a National Survey of Social Studies educators who were members of National Council of Social Studies (NCSS) to find out "Are Social Studies teachers using computer?" The findings of the study revealed that

elementary teachers used computers in Social Studies instruction significantly more often than secondary school teachers. 84 percent of the surveyed teachers indicated that they had access to computers, but only 55 percent of them with access used computers in instruction. (Northup, T., & Rooze, G.E. (1990). "Are Social Studies teachers using computer? A national survey. *Social Education*, 54(4), 212-214.)

Kulik and Kulik (1991), conducted a survey study entitled "Effectiveness of computer-based instruction: an updated analysis." Total 254 controlled evaluation studies were surveyed that compared learners who received computer assisted instruction with the learners who received traditional instruction. The meta analytic approach was used. The study covered learners of all age levels from kindergarten pupil to adult students. It was found that learners tend to learn more and in less time with computer assisted learning. Computer based instructions produces positive effects on students. CBI programmes raised students scores by 0.30 standard deviation in the average study, a moderate but significant effect. CBI also produced small but positive changes in student's attitude towards teaching and computers and it reduced substantially the amount of the time needed for instruction. (*Computer in Human Behaviour*, Vol.7, pp 75-94, 1991 Centre for Research on Learning and Teaching, The University of Michigan, U.S.A)

Burton, Beatrice Spencer (1995), conducted a study on "The effects of Computer-Assisted Instruction and other selected variables on the academic performance of adult students in Mathematics and Reading (CAI)." The objectives were (i) To examine the effectiveness of computer assisted instruction (CAI) versus traditional instruction on the academic performance of adult students on the mathematics and reading sections of the Test of Adult Basic Education (TABE). (ii) This study investigated the independent influence of the variables age, gender, income, marital status, educational level, ethnicity and employment status on the academic performance of adult students on the total section of the TABE. A combination of a non-equivalent control group design and a causal comparative design was employed in this investigation. 200 adults from the Vocational Technical Adult Basic Education Center in Southeast Mississippi were selected to participate in this empirical study. The "Test of Adult Basic Education" was used to collect the data. The data were treated through the application of the one-way analysis of covariance, one-way

analysis of variance, and the Scheffe' follow-up test. Findings revealed that (i) Type of instruction had an influence on the academic performance of adult students on the math and reading sections of the TABE. (ii) Adult students' age had no effect on their total scores on the TABE. (iii) Male and female adult students had similar scores on the total section of the TABE. (iv) The ethnicity had some influence on the academic performance of adult students on the total section on the TABE. (v) The more formal education adult students had obtained, the higher their scores were on the total section of the TABE. (*Ph.D. ISBN:0-591-05641-0*)

Iheanacho (1997), conducted a study examining the “Effects Of Two Multimedia Computer-Assisted Language Learning Programs on Vocabulary Acquisition of Intermediate Level Esl Students.” The first program consisted of motion graphics and text. The second program consisted of still graphics and text. The purpose was to investigate which of the programs would represent a better environment and retention level for learning vocabulary by intermediate level ESL students. It was an experimental study. The population consisted of 102 intermediate level ESL students who enrolled in a large community college located in the southeastern United States. The sample consisted of 86 students (44 females and 42 males). This study used a pretest posttest experimental group design. Two experimental groups were used. Participants were randomly assigned to one of the two experimental groups. Both groups received a pretest, treatment and post-test. The software development followed three instructional design processes. These are: (a) needs assessment, (b) software design, and (c) evaluation and revision. The instruments used for the two treatment groups were the two multimedia CALL applications developed by the researcher. Data analysis was done through descriptive statistics of the mean scores and ANOVA was used to determine whether the differences between mean scores are statistically significant. The findings revealed that (i) Result of the univariate tests showed that the interaction between time and treatment was insignificant. (ii) Both motion and still graphics were effective in vocabulary learning, as significant differences occurred between pretest and posttest in both treatments in favor of posttests. (iii) There was no significant difference between posttest and delayed post-test scores in the motion graphics group. (iv) Significant difference was found between posttest and delayed posttest in the still graphics group. This suggests that the participants in the motion graphics group had better retention from posttest to the delayed posttest than did the

participants in the still graphics group. Multimedia CALL programs appear to be effective in teaching vocabulary, but there appears to be no difference between motion and still graphics when used in learning vocabulary. (Ph.D)

Ross and Schulz (1999), conducted a study on “Can computer-aided instruction accommodate all learners equally?” The objective was to investigate the differences in learning styles among participants. Seventy University of Calgary undergraduate students participated in the study, where the samples were the undergraduate students of Seventy University of Calgary. Results showed that digital educational multimedia package as an instructional tool may not be suitable for all learners with such differences as cognitive learning style. Some learners may have difficulty adapting to certain forms of computer mediated learning. Considering this suggestions made by the researcher discussed the following list indicates the disadvantages of DEMP in the classroom. (i) Lack of DEMP software of High quality. (ii) Low capacity of the equipment. (iii) High cost of equipment and software. (iv) Lack of trained teachers (v) Not suitable for all learners (Due to different learning style) (vi) Computer anxiety among students and teachers. (British Journal of Educational Technology, 30: 5–24. doi: 10.1111/1467-8535.00087)

Garcia and Aries (2000), tried to study the impact of using Digital Educational Multimedia Package in a classroom teaching. It was found out that using digital educational multimedia package in a classroom has the various advantages: Increased motivation of the students, individualization of learning process, immediate feedback, non-linear access to the information and the introduction of new exercise types in the classroom. The following list can be outlined to indicate the advantages of digital educational multimedia package in the classroom. (i) New types of exercise (ii) Repetitive practice (iii) Nonlinear learning (iv) Immediate and detailed feedback to learner as regards their progress, mistakes etc. (v) Increased motivation (vi) Flexible learning (anytime, anywhere, anything learners want) (vii) Less frustration.

Soe, Koki & Chang (2000), conducted a study entitled “Effect of Computer-Assisted Instruction on Reading Achievement: A Meta-Analysis.” This meta-analysis reviewed 17 research studies based on students in grades K-12 with the objective to evaluate the effectiveness of CAI on the reading achievement of K-12 students. Findings revealed that computer assisted instruction (CAI) was found to have a positive impact on

reading achievement. However, researchers are not yet able to determine what aspects of CAI are most helpful to students, what the most effective methods are for implementing CAI, or if CAI is more effective for certain student populations than others. The researchers suggest that CAI can serve as a powerful tool for reading teachers, but it is only suited to be one part of an effective reading curriculum. CAI should be used to supplement, not replace, traditional reading instruction.

Williams et al., (2001), conducted research on “A randomized, controlled, single-blind trial of teaching provided by a computer-based multimedia package versus Lecture” The objective was to investigate the effectiveness and acceptability of computer-based teaching. A single-blind, randomized, controlled study of 166 undergraduate medical students at the University of Leeds, involving an educational intervention of either a structured lecture or a computer-based teaching package (both of equal duration). The findings revealed that there was no difference in knowledge between the groups at baseline or immediately after teaching. Both groups made significant gains in knowledge after teaching. Students who attended the lecture rated their subjective knowledge and skills at a statistically significantly higher level than students who had used the computers. Students who had used the computer package scored higher on an objective measure of assessment skills. Students did not perceive the computer package to be as useful as the traditional lecture format, despite responding it easy to use and recommending its use to other students.

Gabrielle (2003), conducted a study entitled “The effect of technology-mediated instructional strategies on motivation, performance, and self-directed learning.” The purpose of the study was to check the effect of motivation, performance and self-directed learning of undergraduate students. The other purpose of the study was to use new technologies to efficiently deliver these instructional strategies as supplementary course content. The researcher communicated with control and experiment group via e-mail and used e-mail to direct experimental group students to technology-mediated instructional strategies. The findings of the study suggest that systematically designed technology-mediated instructional strategies can positively affect motivation, performance, and self-directed learning. Further, new technologies can help improve the efficiency of delivering such strategies. (*Dissertation Abstracts International*, 65, 7, January, p-2571-A.)

Charsky (2004), conducted a study on “Evaluation of the effectiveness of integrating concept maps and computer games to teach historical understanding.” The purpose of the study was to determine if one of scaffolding, concept mapping, would affect the participants’ games performance, game knowledge, and historical understanding. Three different ninth grade advanced global History classes participated in the study. Each class was randomly assigned a treatment condition. The results indicate that there was not a significant difference between the treatment groups in game knowledge, and historical understanding. However, the participants’ responses and comment made in journals shows that the student did learn about theoretical History and History in general. The results also indicated that the no concept map groups’ motivation for the treatment improved compared to their motivation for regular class room instruction (*Doctoral Dissertation. University of Northern Colorado Greeley, CO, USA*)

Eteokleous (2004), conducted a study on “Computer technology integration in Cyprus elementary schools.” The purpose was to evaluate the current situation in Cyprus elementary classrooms regarding computer technology integration. The study examined how elementary teachers use computers and the factors that influence computer integration in their classroom practices. An evaluative case study design was applied. For data collection structured questionnaires and semi-structured, open ended interviews were used. The results of the quantitative analysis indicated that while Cypriot teachers use computers rather extensively for their own purposes, they use them less frequently in their classes. Regression analysis revealed that teacher’s education, school climate, teacher’s professional behavior and teacher’s attitudes towards the use of computers in education, were significant predictors for classroom computer use. The results of the qualitative analysis summarize the factors that influence teachers in applying computers in their classroom practices. A general uniformity across the three categories of teachers revealed, in terms of the factors that function as barriers in applying computers in the classrooms. The factors can be summarized as follow: lack of resources; tyranny of the curriculum; incomplete and inadequate professional development training. (*Ph.D Philosophy. Department of Education Policy Studies., The Pennsylvania State University, Pennsylvania*)

Rabia (2004), conducted a study entitled the “Effect of Computer Assisted Instruction (CAI) on the Secondary School Students Achievement in Science.” The objectives were (i) To find out the relative effects of computer-assisted instruction as supplementing strategy on the academic achievement in science (ii) To explore the difference between treatment effects on the students of high and low intelligence and (iii) To investigate the difference between treatment effects on male and female students. The students of 9th class (studying biology as elective subject) were selected as sample of the study, assigned to two group i.e. experimental group and control group, equated with 20 students each on the basis of their achievement scores in previous semester in the subject. The study was based on 'operant conditioning' theory of B. F. Skinner. There were two different treatment patterns applied during the experiment. Both the groups were taught through routine method by the same teacher with computer-assisted instruction used as additional strategy for the experimental group. In order to find out treatment effects, and to measure the achievement of the students, a teacher-made post-test was administered to the experimental as well as control group immediately after the treatment. On the scores means, standard deviations, differences between means were computed. Significance of difference between the mean scores of both the groups on the variable of previous achievement was tested at .05 levels by applying t-test. To see the treatment effects for male and female students as well as high and low levels of achievement of both the groups, the factorial design (2 X 2 analysis of variance) was applied by dividing the students of both groups into two halves, namely, high achievers (above the mean score) and low achievers (below the mean score) on the basis of scores on previous achievement test. Analysis of data revealed that the students taught through computer-assisted instruction as supplementary strategy performed significantly better. The students with high achievement level showed better results than those with low achievement level when taught through computer-assisted instruction. The computer-assisted instruction was found equally effective for both male and female students. (*Ph.D thesis, University of Arid Agriculture, Rawalpindi.*)

Zhao (2004), conducted study entitled “Social Studies Teachers’ Perspectives of Technology Integration.” The aim was to investigate how a purposive sample of Social Studies teacher’s perceive technology integration and how they use technology in the Social Studies classrooms after technology integration training. A qualitative

interview design was used. A qualitative semi-structured interview as the primary method and document analysis as the supplementary method of data collection was used. 17 secondary Social Studies teachers (in grades 7-12) were selected as samples that had successfully completed In-Tech technology integration training. Strategies to collect data used were interviewing and analyzing a variety of documents. Qualitative data analysis was the process of making sense of data, sifting, organizing, cataloging, and determining themes. The findings revealed that (i) *Teachers' visions of technology integration*: Some used technology for its efficiency, some embrace it for the enhancement of their instructional practice and student learning still others use it for relaxation, and most use it for a combination of purposes. a way to help them become more capable teachers, to help their students better learn knowledge and develop the necessary skills required to function well in the future society. (ii) *Technology use in the Social Studies classroom*: Technology offered participants a variety of opportunities for improving their Social Studies teaching and learning. They used technology to facilitate their work, to increase their instructional strategies, and to encourage students to use technology to explore and present information. Participants in this study offered a great number of examples of technology use in their Social Studies classrooms. Many of the participants were able to engage students in student-centered, research-based inquiry to help develop their creativity, research ability, higher order thinking as well as civic competence. A few participants encouraged students to use primary sources available on the internet; however, such examples were limited. The examples provided by the participants in this study do not encompass all of the kinds of instructional methods available. There could be more points on the continuum. Despite all these advantages, this research indicates that participants were not engaging students in student-centered activities on a regular basis. Participants offered a great number of examples of student-centered activities in using technology and they considered these activities as the most successful lessons they did with technology. However, they concurred that student centered activities should only be done when and where they fit. While some participants claimed that use of technology enabled them to cover more information in a shorter period of time, most participants emphasized that a student-oriented technology-connected lesson took a much longer time than a teacher-centered lesson. Even if they were willing to integrate technology in the classroom and had all necessary resources available, they needed to consider what content they were teaching, how much time they had, and

what was the most important objective at the moment. Time, curriculum, and testing were important factors that affected whether they would use student-centered, technology-connected lessons. Willingness to use technology and positive experiences were related to participants' increased use of technology and to more creative use of technology, but they do not ensure that teachers will replace their teaching with technology. Use of technology does lead to some changes to teachers' teaching styles, but it does not produce a fundamental change. (iii) *Impact of technology integration training*: Technology integration training exposed participants to a great variety of new ideas and insights into how technology can be integrated into the Social Studies curriculum, with difference in degree of change. Becoming familiar with some computer programs and being confident in using them in many and varied ways were seen as the most important outcomes of In-Tech training. Technology integration training has positively affected most of the participants in terms of their attitudes toward technology, confidence, and competence in using technology for Social Studies instructional purposes. As a result of this training, they were able to use technology more frequently and more meaningfully. However, technology integration training does not ensure that every participant will accept and use technology as expected. (iv) *Identifying and coping with barriers*: Technology integration training does not ensure that every participant will accept and use technology for instructional purposes. A few participants' deeply-held pedagogical beliefs still posed a big barrier to their use of technology. Their desire to maintain the traditional role as a knowledge holder and dispenser remained strong, even if they had successful experiences of integrating technology in the classroom. (v) *Factors that help teachers grow into enthusiastic technology users*: quite a number of participants have developed into enthusiastic technology users, attributed their attitude and instructional change as well as their present level of technology use to several factors: InTech training, personal commitment, early success, and learning from different resources. (Ph.D., The University of Georgia, Athens, GEORGIA)

Cannon (2005), conducted study on "Student success: A study of Computer based instruction versus lecture based instruction in developmental Mathematics at a Tennessee Community College." The objectives were (i) To examine the effects of incorporating computerized instruction developmental Mathematics courses. (ii) To study examined achievement, retention, persistence and success of students who

began in elementary algebra, progressed into intermediate Algebra and subsequently obtained their goal of completing an initial college level Mathematics course. Two groups of elementary algebra from Chattanooga State Technical Community College were used in this study. One group was taught using a lecture based approach and one group was taught using a computerized instructional approach. The lecture group consisted of 175 students where the computer group consisted of 208 students. The findings revealed that the lecture students' achievement rates were significantly higher than the students who received computerized instruction. Retention, persistence and success did not show any significant difference between the two groups. *(Ph.D. Dissertation. University of Tennessee – Knoxville)*

Rosales (2005), conducted a study to describe “The effect of Computer Assisted Instruction on the Mathematics achievement of ninth-grade high school students in the lower Rio Grande valley.” as measured by the state assessment. A quasi experimental pre-test post-test control group design with matching was used. The experimental group utilized a commercially available computer assisted instructional program in addition to instruction as described in the Academic Excellence Indicator System (AEIS) and according to instruction as district curriculum guidelines. The control group utilized only instruction as described in its Academic Excellence Indicator System (AEIS) and according to district curriculum guidelines. Spring 2003 eighth grade Mathematics state assessment, Texas assessment of knowledge and skills, served as the pretest for both groups. Spring 2004 ninth grade mathematics state assessment, Texas assessment of knowledge and skills served as the post test for both groups. ANCOVA procedures were used to determine the statistical significance. Findings revealed that there is a statistically significant difference between the Mathematics achievement of ninth grade high school students in the lower Rio Grande Valley who have participated in computer assisted instruction and the Mathematics achievement of ninth grade high school students in the lower Rio Grande Valley who did not participate in computer assisted instruction. The resultant analysis indicated that there was statistically significant difference between the Mathematics achievements of the two groups. *(Ph.D. University of Houston TX, USA)*

Floyed (2006), conducted a study on “The use of technology and its effect on student achievement.” The study was conducted to examine the use of technology and its effect on student achievement. The result of the study revealed that when comparing surveys of administrators, teachers and students with student test scores, the principal responses indicated a negative correlation to student test score result. The responses of the teachers in the teacher technology survey and the teacher pedagogy survey showed no correlation to student achievement and responses for the students in the student technology survey indicated a positive correlation to student achievement. The data showed that student technology use increases student achievement increases. *(DAI April 2006 volume 67 no 10 pg. 3786)*

Spradlin (2010), conducted a study investigating “The Effectiveness of Computer Assisted Instruction in Developmental Mathematics.” The objective of this study was to investigate whether computer- assisted instruction enhances the learning of developmental mathematics or if traditional instruction is more effective for these students. Also, is there any difference in the mathematical performance of males and females in developmental mathematics courses? The nonrandomized control group pretest-posttest design was used for this quasi-experimental study. Questionnaire and SPSS were used as a tool. For data analysis ANCOVA was used. The findings revealed that there was no statistically significant difference in the posttest scores of students receiving traditional instruction and traditional instruction supplemented with computer-assisted instruction. There was a significant difference in the posttest scores of females and males, with females outperforming males in both modes of instruction. The results of this study indicate that developmental mathematics students learn equally well with or without computer assisted instruction. The mere presence of computers does not improve student learning. Computers have the potential to be useful tools to improve learning; however, it is the responsibility of the faculty to choose software that meets the needs of the course and the students, to use it effectively, and to require its use. As supported by questionnaire responses, students have an interest in using technology for a variety of purposes including academics. Educators can tap into this interest by using technology deliver instruction and assess learning. Computer learning systems provide educators the opportunity to create courses in a variety of alternative formats to the traditional lecture in order to address the different learning styles and preferences of students. Quality is essential in any

mode of instruction. The current study also suggests that females may learn more than males in a developmental mathematics course. (*Faculty Publications and Presentations. Paper 195. http://digitalcommons.liberty.edu/educ_fac_pubs/195*)

Riaza & Halimah (2011), conducted the study entitled “The Effects of Varied Animation in Multimedia Learning: Is the extra effort worthy?” The objective was to investigate the effects of animation on student understanding when studying a complex domain in computer science, the subject of memory management concepts in operating systems. The study was experimental in nature. Participants were 101 first year students from the Faculty of Computer Sciences at UiTM, Shah Alam they were assigned into one of these groups. These students had no prior knowledge in this subject and were assumed to be homogenous in terms of age, education and cultural background. The system with 2-D animation was designed using macromedia flash and concepts of swapping, contiguous memory allocation and paging techniques were explained using animated form in 2-D. The system with 3-D animation was designed using 3D Max and the concepts of memory management were explained using animated form in a 3-D realistic version. After treatment, test which tested them for recall and transfer knowledge was taken. Findings showed that (i) there was no significant effect on 2-D or 3-D animated group on the recall scores and transfer scores for students. This means that there were no advantages of 3-D animation over 2-D animation in generating better recall knowledge amongst the students. (ii) Mean scores showed that students performed better in recall questions than transfer questions. This was because transfer questions were problem based and students, who were especially those with low prior knowledge, could not understand all the concepts enough to solve some of the more complex problems. (iii) The effects of instructional visuals were maximized when the same kind of pictorial cues were used at retrieving and encoding time. (iv) Other reasons on why the use of 2-D and 3-D animation did not have a significant impact on the test scores could be due to the quality of animation implemented. Much time and effort was invested in the design of the animation and the graphics used in the 2-D version can be considered to be typical for those found in the textbook. However, the animation used for 3-D representation was entirely the idea of the author which had incorporated a constructivist approach. Researcher expected the 3-D animated version to provide a better understanding especially in recall and transfer. The total score was in favor of the 3-D animated

version but the score difference was not significant enough. (*International Journal of Digital Information and Wireless Communications (IJDIWC)* 1(3): 582-590)

Riaza and Halimah (2011), conducted study entitled “Designing multimedia learning application with learning theories: A case study on a computer science subject with 2-D and 3-D animated versions” with the objective to compare the effectiveness of the 2-D and 3-D animated versions of OSIMM by conducting a series of experiments on users. Mayer's cognitive theory of multimedia learning was applied as a guideline in the multimedia development process, to achieve a learner-centered approach in the application, and the prototypes in two versions (2-D and 3-D animation) were developed. To compare the effectiveness of the 2-D and 3-D animated versions of OSIMM by conducting a series of experiments on users. The measure of effectiveness will be determined by giving the students a test on recall and transfer knowledge. This research would further be refined by conducting a series of experiments with two sets of users, low prior knowledge and high prior knowledge. This would be achieved by asking the users to fill in a prior knowledge survey. Findings of the study are yet to be found out.

Chen & Chung (2012), conducted a study entitled “Research on the Learning Effects of Multimedia Assisted Instruction on Mandarin Vocabulary Acquisition for Vietnamese Students (Part II): A Case Study.” with the assistance of the ASSURE model. The aim is to understand the difficulties encountered by these students and the effects during the learning progress of multimedia assisted instruction. The study made use of qualitative research methods such as interviews, participant observation, and document analysis to follow the progress of 11 Vietnamese students for three months. The study results showed that the use of multimedia assisted instruction could promote the learners' speed of understanding and memorization of vocabulary. Better transfer of learning during the simulation scenario was also shown. Moreover, the test results of most students showed significant improvement after using multimedia assisted instruction. However, some difficulties were encountered during the learning process, for example; too much English content in the multimedia teaching materials was not necessarily helpful. Students were also subject to loneliness because of the use of multimedia when practicing by themselves after class. This led to insufficient interaction with teachers and classmates. Students with weak

initiative and will power would be influenced and distracted by other information from the Internet. (*Educational Research and Reviews*, v7 n14 p315-325 Apr 2012 (EJ982138))

Cheng, Cheng & Chen (2012), conducted a study to investigate “The Effect of Multimedia Computer Assisted Instruction and Learning Style on Learning Achievement.” using the high school curriculum entitled “molecules that dominate secret of life” from high school biology. Research design adopted was experimental design. There were 108 students from five classes selected throughout the high school and the total effective sample size was 95 people after removing 13 students with absence during the experimental period and invalid questionnaires. The study classified the students into 8 groups with codes from A to H according to two indicators: learning style (Diverger, assimilator, converger, or accommodator) and teaching model (multimedia computer assisted instruction model or traditional teaching model). The multimedia computer assisted instruction model and traditional teaching models were used in the instruction of “factors that dominate the secret of life”, a high school biology curriculum. After two weeks of experiment treatment the posttest was administered and “learning achievement” scores were collected. The effects of different instruction models on learning achievement were tested using ANCOVA. The effects of different instruction models and learning styles on learning achievements were examined using MANCOVA. The results showed that (i) when compared to traditional models of instruction, students using the multimedia computer assisted instruction model scored significantly better in learning achievement assessments.(ii) Students exposed to a converging learning style with traditional instruction perform significantly better than those exposed to three other learning styles. Nonetheless, students exposed to these same three other learning styles performed better when exposed to the multimedia computer assisted instruction model. As a result, under the influence of multimedia instruction, students exposed to the four learning styles (Diverger, Assimilator, Converger, and Accommodator) do not shown any significant difference. (*WSEAS TRANSACTIONS on INFORMATION SCIENCE and APPLICATIONS Issue 1, Volume 9, January 2012 pp. 1 -33: E-ISSN: 2224-3402*)

Narzoles (2013), conducted a study on “The Effect of Multi-media Instruction on Student Learning.” The objective was to investigate the effect of multi-media instruction in improving learning of students. Forty eight students enrolled in World Literature course were used as subjects of the study. Multi-media instruction was utilized in the experimental group while the traditional teaching method was used for the control group. Quasi-experimental design was adopted. The pre-test mean scores identified the primary knowledge of the participants. After the conduct of the selected topics using multi-media instruction, the students were given a post-test. Results showed the students who were exposed to multi-media instruction had enhanced academic performance in the World Literature course. Apparently, results on the post-test mean scores of the students revealed that there is a significant effect on the academic performance of the experimental group in which the multi-media instruction had been employed. Thereby, students who had multi-media instruction executed better learning than students who were taught in the traditional teaching method. Furthermore, results typify that there is a significant relationship between the students’ motivations in learning English and their academic performance in the World Literature course. (*in Journal of Education and Practice* www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.4, No.5, 2013)

2.2.3 Researches on Teaching Geography Through Multimedia Package and / or CAI

Total six studies were found and analysed in the area on teaching Geography through multimedia packages conducted abroad.

Perzylo & Oliver (1992), conducted a study to investigate the use of an interactive multimedia CD-ROM in a class of 32 elementary school children. i.e. An investigation of children’s use of a multimedia CD-ROM product for information retrieval. The study used conducted using an ethnographic design. The study used The National Geographic Society Mammals Multimedia Encyclopedia (1990) in a classroom research activity for four weeks. Researchers used field notes, students’ summary papers, and interviews for gathering data. The results showed that students found CDROM intervention easier and more efficient than traditional use of other educational resources. (*Microcomputers for Information Management*, 9 (4), 225-239.)

Hickey & Bein (1996), conducted study a that focused on the narratives from teachers concerning their students emerging concepts of Geography and the problem areas for the students. The teachers made attempts at instructional intervention to tackle some of these problem areas. Research suggests that students at all levels experience difficulties formulating and understanding Geographic concepts and ideas. The teachers who participated in the study agreed that textbook or paper and pencil tasks alone were insufficient instructional strategies whereas learning through hands on activities and visual models were found to be more effective. The study also found that a student's Geographic learning can be enhanced through the creative process of making models, demonstrations or creating experiments. Visualizing physical aspects of Geography, through video or multi-media can also be seen to enhance the learning experience for the student. These all add dimension to the teaching and learning of Geography that satisfies different learning styles i.e. visual, tactile and auditory. (*Journal of Geography in Higher Education*, 95(1), 118-125)

Proctor & Richardson (1997), conducted a study entitled "Evaluating the Effectiveness of Multimedia Computer modules as Enrichment Exercises for Introductory Human Geography." The objective was to develop multimedia computer modules and evaluate the effectiveness of Multimedia Computer modules as enrichment exercises for Introductory Human Geography. Experimental study was conducted. A careful experimental evaluation of two multimedia computer modules was used as enrichment devices for an introductory human Geography course at the University of California, Santa Barbara. The objectives were to determine their overall effectiveness, as well as the kinds of students and kinds of geographical knowledge and skills they best served. The findings of the study pointed out rather the disappointing results in respect of all three of these areas and tend to corroborate one published allegation that quantitative evaluation of multimedia effectiveness is itself ineffective, due primarily to the inherent complexity of learning. The conclusion of this article, and of the study, is that an array of quantitative and qualitative evaluation methods will better serve the important objective of improving multimedia use at the university level. (*Journal of Geography in Higher Education*, Vol. 21, No.1, 1997)

Hall (2000), conducted the study on "Field Dependence-Independence and Computer-based Instruction in Geography." This study presented Geography students with a

computer program that contained jigsaw puzzles made from maps and randomly varied the type of interactivity available to learners when solving the puzzles. Field dependent learners were expected to solve the puzzles more quickly and accurately when they were able to interact with the jigsaw puzzle. Findings showed the research on the cognitive style field dependence-independence establishes its influence on learning and students' outcomes across academic disciplines and at all levels of schooling. Field dependent learners generally perform less well than field independent individuals in most instructional environments. The consequences of cognitive style differences have not been thoroughly pursued by Geography educators, and field dependent learners are generally disadvantaged. Field dependent learners may perform well in hypermedia based environments configured to support their learning needs. The interactive treatments provided by the program did not improve the performance of field dependent individuals as expected. (*Ph.D. in Teaching and Learning. Faculty of the Virginia Polytechnic Institute and State University. Blacksburg, Virginia.*)

Jain & Getis (2003), studied "The Effectiveness of Internet-based Instruction: an experiment in physical Geography". This research was experimental in nature. Methodology used in testing was the, "pre-test post-test comparison group. A single Geography lesson was taught with multimedia computer vs. conventional classroom instruction. One hundred students from five sections of GEOG 101L at San Diego State were split into two groups for testing. This research involves a matched-pairs experiment that assesses the differences in student performance between a group of students taking an Internet based lesson in introductory physical Geography, and another group learning the same material via traditional classroom methods. Both groups were subject to the same knowledge assessment post-test, and scores were statistically analysed to determine whether one instructional method led to better student performance over the other. Findings revealed that there was no significant difference in post-test scores between students who learned material on fluvial processes from their classroom instructor, in lecture format, and those who learned the material from an Internet-based lesson." However Results showed that the Internet can be a viable alternative instructional tool compared with traditional classroom methods. Multimedia instruction has the potential for a much-improved presentation

especially of difficult to understand or describe subjects (*Journal of Geography in Higher Education*, 27(2), 153-167.)

Crooks, Verdi & White (2005), conducted a study entitled the “Effects of Contiguity and Feature Animation in Computer-Based Geography Instruction.” with the objectives to examine the effects of contiguity and feature animation on the recall, map reconstruction, inference performance, and en-route behavior of university students studying a computer-delivered reference map with associated text. Participants were randomly assigned to six versions of a computer program created by crossing three contiguity conditions (temporal contiguity, spatial and temporal contiguity, and no contiguity) with two map feature modes (animation, no animation). The findings revealed that the participants studying text contiguous to features recalled more facts, matched more facts with corresponding features, and made more accurate inferences than those studying text not contiguous to features. Participants in the temporal contiguity conditions produced better map reconstructions than those in the no contiguity conditions. Those studying an animated map recalled more feature names than those studying a static map. (*Journal of Educational Technology Systems, Issue: Volume 33, Number 3 / 2004-2005 Pages: 259 – 281*)

2.2.4.0 Observations of Researches from Abroad

Studies in the area of teaching Geography, CAI and/or multimedia package in teaching-learning and in specific in Geography were thoroughly reviewed and following observation were made by the researcher for the studies conducted abroad.

2.2.4.1 Observations of Researches in the Area of Geography Conducted Abroad

Researcher came across versatile studies in the area of Geography more in pure Geography which the researcher has not reviewed in detailed and so are not mentioned. Some of the studies that researcher could relate to his study were reviewed for which the observations are dropped down.

- i. In Geography, although the terms are being taught in class there is limited conceptual gain experienced by the students and little or no connection made between the vocabulary and the meaning. Dal (2008)

- ii. In Geography, Internet can be a viable alternative instructional tool compared with traditional classroom methods. Jain & Getis (2003)
- iii. Quantitative proof that multimedia enrichment activities are a positive benefit to lower-division undergraduate Geography is an alluring though elusive goal. Proctor & Richardson (1997).
- iv. There was a positive relationship between high test scores and high levels of computer usage in Geography. The National Center for Educational Statistics (2000).
- v. To strengthen students' understanding of concepts in Geography, digital technology appears to be one solution. National Assessment of Educational Progress (2002).
- vi. There are some key issues effecting technology integration with secondary social science classrooms the factors affecting use of technology were resources, constraints, support and skill. It also showed that the teachers' effect was a composite of teachers' experiential knowledge, belief and gender. Heafner (2002)
- vii. Those studying an animated map recalled more feature names than those studying a static map. Crooks, Verdi & White (2005).
- viii. In Geography, field dependent learners may perform well in hypermedia based environments configured to support their learning needs. Hall (2000)
- ix. The teachers who participated in the study agreed that textbook or paper and pencil tasks alone were insufficient instructional strategies whereas learning through hands on activities and visual models were found to be more effective. The study also found that a student's Geographic learning can be enhanced through the creative process of making models, demonstrations or creating experiments. Visualizing physical aspects of Geography, through video or multimedia can also be seen to enhance the learning experience for the student. Hickey & Bein (1996)

2.2.4.2 Observations of Researches in the Area of Computer Based Multimedia Package and/or CAI Conducted Abroad

Most of the studies conducted in abroad were related to the integration of the CAI and/ or Multimedia Package with various subjects and technology either at school level or university level. Many researches are found following quasi experimental design. The findings can be summarizing as follows:

- i. On analyzing the researches regarding effectiveness in comparison with traditional method, it is elicited that there is a mixed opinion towards the effectiveness of CAI/ Multimedia Approach as against Traditional method. Some of the researches opine that experimental or CAI group perform better than the traditional group. Burton, Beatrice Spencer, (1995), Rosales, J. S. (2005), Floyed (2006). Computer program can be erroneously perceived to affect student knowledge acquisition, when in fact it is the instructional method built into the program that affects Knowledge acquisition. Kulik, Kulik, and Drowns (1984) in a meta-analysis of multimedia research. Computer package scored higher on an objective measure of assessment skills. Williams et al., (2001). Multi-media instruction had enhanced academic performance in the World Literature course. Multi-media instruction executed better learning than the traditional teaching method. Narzoles (2013)
- ii. Whereas some studies reveal that Traditional Lecture method is more effective than CAI or Multimedia Approach. The lecture students' achievement rates were significantly higher than the students who received computerized instruction. Cannon, T. R. (2005). Medical students rate themselves subjective learning less from computer-based as compared with lecture-based teaching. Objective measures suggest equivalence in knowledge acquisition and significantly greater skills acquisition for computer-based teaching. Students did not perceive the computer package to be as useful as the traditional lecture format, despite responding it easy to use and recommending its use to other students. Williams, Aubin, Harkin & Cottrell (2001).
- iii. Multimedia assisted instruction results in significant improvement in subjects but results to loneliness, insufficient interaction with teachers and classmates. Chen and Chung (2012). Whereas study of Garcia and Aries (2000) states about less frustration through multimedia package.
- iv. The quantitative evaluation of multimedia effectiveness is itself ineffective, due primarily to the inherent complexity of learning. Proctor & Richardson (1997)
- v. Digital Educational Multimedia Package in a classroom results in increased motivation of the students, individualization of learning process, immediate feedback, non-linear access to the information and the introduction of new exercise types in the classroom, flexible learning & less frustration. Garcia and Aries (2000). Multimedia usage in the classroom results in more engaging

classroom environments, more effective ways of communicating information, enhanced student's development of ideas, increased student satisfaction and motivation levels, among others. Gaytan and Slate (2002) whereas the improvement in motivation was not seen when concept map were implemented compared to their motivation for regular class room instruction. Charsky (2004)

- vi. Digital Educational Multimedia Package as an instructional tool may not be suitable for all learners with such differences as cognitive learning style. Ross and Schulz (1999). The students with high achievement level showed better results than those with low achievement level when taught through computer-assisted instruction. Rabia (2004)
- vii. Motion Graphics had better retention from posttest to the delayed posttest than the Still Graphics. Iheanacho (1997). Whereas CAI did not show any effect on retention when compared to traditional method. Cannon (2005)
- viii. Technology reduces substantially the amount of the time needed for instruction. Kulik and Kulik (1991). On the other hand much time and effort needs to be invested in the design of the animation and the graphics used in the 2-D version and for 3-D representation. Riaza & Halimah (2011).
- ix. The computer-assisted instruction is found equally effective for both male and female students. Rabia (2004)
- x. CBI produced small but positive changes in student's attitude towards teaching and computers. Kulik and Kulik (1991)
- xi. The factors of lack of resources; tyranny of the curriculum; incomplete and inadequate professional development training are obstacles in integration of computer technology. Eteokleous (2004)
- xii. CDROM intervention is easier and more efficient than traditional use of other educational resources. Perzylo and Oliver (1992)
- xiii. The type of instruction has an influence on the academic performance. Burton, Beatrice Spencer, (1995). Systematically designed technology mediated instructional strategies can positively affect motivation, performance and self - directed learning. Gabrielle (2003)

Summing up the effects of CAI and/or multimedia on students' achievement and learning the Researcher found that it produced assorted and inconsistent results for different subject matters in general education though with major studies evidencing

that CAI and/or multimedia can produce better academic outcomes than traditional or teacher directed instruction. It is very imperative to note that there are other factors or puzzling variables that may affect students' learning and achievements in different setting and circumstances such as the type of CAI and/ or multimedia package, subject matter to be deliberate, characteristics of learners, level of student engagement, or academic learning time. The researcher can be at ease in deliberating the results if he carefully considers the aspects like "which" type of CAI and/or multimedia for "whom" and under "what conditions".

2.3.0 IMPLICATION OF REVIEW OF RELATED STUDIES FOR THE PRESENT STUDY

The brief summary of review of related studies shows that studies related to Geography have been conducted at primary, secondary and higher level and attempts have also been made and have proved helpful in the bringing modifications in the way Geography is taught but are not sufficient to abreast to the need of the hyper world. The impact of science and technology has been phenomenal which can be seen from the use of the computers in various aspects of life and in various ways. It has changed the nation's economy and the life style of the people in the society, especially after the advent of internet, effect is seen on learning through website design as reflected in the studies of Zschocke (2002). Young children are also able to navigate and recall information presented on web easily (Pfister-Brightman,2001) and so accordingly the demands from the education has changed where education is expected to teach children to live in this rapidly moving world. In fact, the attempt is in progress and over the last few decades through various researches we have accomplished a much better understanding of the child, as an evolving entity, of the learning process, and of the role of the education in stimulating his/her ideal growth.

Also, continuous progress is visible in education and according to the need of days, the use of learning packages in the teaching-learning process as an innovative strategy has been adopted. Multimedia packages incorporating a lively and aesthetic combination on text, graphics, animation, sound and music interspersed with crisp video presentation, etc. can be an additive in that progress. Multimedia packages, if planned effectively, could help in minimizing the expenditure on teaching and optimizing the use of technical expertise as well as human resources, thus resulting in

both qualitative and quantitative improvement. Good quality multimedia packages, if developed can bring in life animation to simulate the learner's imaginations and make learning an easy process. Studies reflects that computer aided multimedia packages have also proved to be effective in bringing change in achievement level, motivation level, interest level and in the attitude of the students towards different subjects. In instructional process at school level the computer enhances the learning process. Shayer (1970) and Swetman (1972), as cited by Khirwadkar, A. & Pushpanadham, K. (2005). Reviewed literature also reveals the attempts made to study the effect of multimedia packages in different subjects in the field of education but the researcher has come across very few studies (especially in India) where Computer Aided Multimedia Package and its efficacy to teach Geography is stressed upon in the study which is also equally essential. The lack of research in this area in India certainly justifies this research endeavour. Moreover review of related literature's research suggests that teachers are keen to integrate ICTs into teaching and learning but find it difficult to know what to select from the array of available products. There is a perception that readily available multimedia products in the market are the professional works output and sometimes do not function as described by manufacturers. Moreover, such programs as are standardised ones may not suit the requirements of particular age of the student and may not be comprehensive to the content of the book to be explained. Many software packages related to the content from the theoretical point of view of the textbook are available on the internet but are to be paid off to have an access.

By looking into the importance of multimedia packages and its immediate availability to impart instructions, the researcher proposed to develop and implement a multimedia package to teach Geography to standard IX students following CBSE syllabus and proposed to further assess its efficacy through students achievement and their reaction towards the developed package so that it can be an added positive step to strengthen the research, innovation and knowledge in the area of Geography Education.