

**DEVELOPMENT AND IMPLEMENTATION OF MULTIMEDIA
PACKAGE TO TEACH GEOGRAPHY AT
STANDARD IX CBSE STUDENTS**

**A Thesis Submitted To
The Maharaja Sayajirao University of Baroda
For the Degree of**

Doctor Of Philosophy

In Education

Guide

PROF. ASHUTOSH BISWAL

Researcher

LAKSHMI NARAYAN SINGH



CENTRE OF ADVANCED STUDIES IN EDUCATION (CASE)

DEPARTMENT OF EDUCATION

FACULTY OF EDUCATION AND PSYCHOLOGY

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

VADODARA, GUJARAT

DECEMBER, 2013

**CENTRE OF ADVANCED STUDIES IN EDUCATION (CASE)
DEPARTMENT OF EDUCATION
FACULTY OF EDUCATION AND PSYCHOLOGY
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA,
VADODARA, GUJARAT-390002**



CERTIFICATE

This is to certify that the thesis entitled '**Development and Implementation of Multimedia Package to Teach Geography at Standard IX CBSE Students**' submitted by **Mr. Lakshmi Narayan Singh** is a record of research work carried out by him for the Degree of Doctor of Philosophy under my guidance. Also, the thesis has not formed the basis for award of any other Diploma, Degree, Fellowship or other similar titles and that the thesis represents an independent endeavour on the part of Mr. Lakshmi Narayan Singh, under my guidance. No portion of this thesis is a reproduction from any other source, published or unpublished without acknowledgement.

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December, 2013
Place: Vadodara

Prof. Ashutosh Biswal
Guide

ACKNOWLEDGEMENT

It is remarkable time and precious moment to honour and acknowledge one and all those who assisted me getting my thesis accomplished successfully. To embark on I initiate thanking the Almighty God, who is for eternity with me inspiring and strengthening me to triumph over all challenges that I come across within and outside me.

A Guru akin to God deserves the privilege to be honoured for whatever struggle he did in getting my work reach an end. I owe my earnest thanks to my esteemed guide Prof. Ashutosh Biswal, Department of Education, Centre of Advance Study in Education, Faculty of Education and Psychology, The M.S. University of Baroda, Vadodara. His trust in me gave me opportunity to reach this level of knowledge. His mammoth understanding, suggestions, level of patience and encouragement, dear concern for my work helped and directed me in every core and critical steps taken forth to complete the thesis. It was just not possible to analyse and interpret the collected data in specific and overall research work in general without his impartial support.

I extend my earnest gratitude to Prof. R. G. Kothari, Dean, Faculty of Education & Psychology for his continuous guidance and support forever.

I express my sincere thanks to Prof. S.C. Panigrahi, Head, Department of Education for his continuous assistance and encouragement to achieve this goal.

I extend my heartily gratitude to Prof. D.R. Goel, Prof. N. Pradhan, Prof. S. Kumar, Prof. R.C. Patel, Prof. R.S. Mani, Prof. K. Pushpanadham, Dr. V.D. Thomas, Dr. K.S. Joseph, Dr. D. Rao, Mr. V.R. Acharya, Dr. Milind Sahasrabuddhe, Dr. N.P. Deota, Dr. Jaishree Das, Dr. Chhaya Goel, Dr. Dipti Ojha, Dr. Sujata Srivastava, Dr. Anjali Khirwadkar and Dr. Anjali Metha, Faculty of Education and Psychology, The M.S. University of Baroda, Vadodara, for their persuasion and concern towards the progress that I did in my work.

I am immensely grateful to the experts for their discerning review and reflections helped me in construction and development of tools.

I gratify Mr. Tushar Dave and his team of technicians for their unstoppable optimistic approach, support and hand in the construction and development of Multimedia Package. I gratify Ms. Jyoti who worked with me cope up with my voice recording to be incorporated for the content in the Multimedia Package.

I am thankful to the Management of the P.P. Savani Chaitanya Vidya Sankul, Surat who permitted me to conduct the research work without any interference and supported me to their fullest extent. I thank the Principal and the Management of the Radiant English Academy, Surat, for permitting to make the IX grade school students as control group for the study and for coordinating with me all the time.

It was nothing else but the blessings and immortal support of my Parents, Late Shri. Mohan Singh and Late Smt. Radha Devi, showered on me that encouraged, motivated and enlightened me to accomplish the undertaken task. I am indebted to them for lives to come. I express my gratitude for my brothers and sisters for their guidance for ever. Every success flow through when conducive is the environment that complements the work. Indeed, I am grateful to my wife Chanchal Singh and my children Armaan Singh and Pradyot Singh who were there by my side in all work I did.

I extend my heartily thanks to my parent-in-laws Shri Raj Kumar Gupta and Smt. Sarla Gupta for their social and moral support on my regular visits to Baroda for my research work. I am grateful for the assistance extended by my brother-in-law and sisters-in-law in my research task.

I thank the teaching and non-teaching staff at P.P. Savani Chaitanya Vidya Sankul, Surat, for their extended support during the research work.

I owe my gratitude to one and all who have directly and indirectly extended their well wishes and cooperation that made this endeavor possible and made the cherished dream come true.

Lakshmi Narayan Singh

December, 2013.

Researcher

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CHAPTER I

CONCEPTUAL FRAMEWORK

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CHAPTER I

CONCEPTUAL FRAMEWORK

1.0.0 INTRODUCTION

Every individual is a part of the community and it is not merely a History or Geography or Civics or an Economics that matters, but rather the man himself who influences and is influenced by his history, his geography, his civics or his economics and his community. Learning about people and the various ways in which they interact with each other and with the various environments in which they find themselves is very essential. The way to make people aware about themselves and their environment is through education. The aim of providing education to the children is the all round development of their personality. The subject of the Social Studies which deals directly with man and the society in which he lives, carries special responsibility of preparing young children to become well informed, constructive participants in society and capable of developing healthy social relationships. The scope of Social Studies is very vast and in fact as wide as the world itself and as lengthy as the history of man on this earth. It includes the millions of years prior to recorded history and also the foreseeable future. Specified in Methods of Teaching Social Studies, in the words of John. O. Michaels (as cited in Kumari, B.V. & Rao, D.B., 2004), “The breadth of Social Studies programme should provide for a variety of experiences so that the child’s learning will be well-rounded and well balanced. It should also be possible to draw upon other fields of learning so that significant problems can be considered in the light of their ramifications; a narrow compartmentalized programme limits social learning”.

The term Social Studies is of recent origin. Its widespread use was started in 1916 in the USA. Its origin in India can be traced back with the formulation of the Basic System of Education in 1937. National Policy of Education in the year 1986 changed the nomenclature from Social Studies to Social Science. Here onwards in the present study the terms will be used interchangeably.

The importance of Social Studies or Social Science has been felt worldwide for the purpose of social reconstruction and development of the mankind, details of which are given as follow.

1.1.0 IMPORTANCE OF SOCIAL SCIENCE

J.F. Forrester (1948:8), in *Teaching of Social Studies* by Mangal defines “Social Studies, are, as the name suggest studies society and its chief aim is to help pupils to understand world in which they have to live and how it came to be, so that they may become responsible citizens. It aims at promoting critical thinking and a readiness for social change, at creating a disposition for acting on behalf of the general welfare, at an appreciation of other cultures and a realization of the interdependence of man and man and nation and nation.”

An NCERT publication entitled ‘National Curriculum for Elementary and Secondary Education’ (1988) has used the term Social Science. It has observed “Social Sciences is perhaps the singular curricular area which can prove to be most effective tool for providing education in the context of all the core components indicating in the NPE (National Policy of Education) 1986”. The common core envisaged by NPE comprises (i) History of India’s Freedom movement, (ii) Constitutional obligations, (iii) Values such as India’s common heritage, (iv) Egalitarianism, democracy, secularism, (v) Equality of sexes, (vi) Protection of environment, (vii) Small Family norms, etc.

As Social Science is the study of the people and their interactions with one another, surely some of the following justifications were found for its existence in the school curriculum. Social Science is important in school curriculum, because of the following reasons.

1. It deals with the inter relations that develop between and among people and those that develop between people and their environment.
2. It is a broad and composite instructional area which draws its contents from different Social Sciences.

3. It is a compound rather than a mixture where the ingredients lose their identity and something tangible and worthwhile emerges out of the combination of teaching of History, Geography, Civics, Economics, etc.
4. It aims at enabling the students to adjust to their social environment which includes the family community state and nation and in fact the entire humanity.
5. It deals with art of living.
6. It deals with those areas of curriculum that enable the students to interpret intelligently the matrix of social forces and movements in the midst of which they are living.
7. It establishes relationships between present, past and future.
8. It integrates the knowledge of all Social Sciences and is, therefore, called 'coordinated' and 'coordinating'.
9. It is the applied branch of Social Sciences, introduced in the school curriculum with a view to develop proper attitudes, sensibilities and skills in future citizens.
10. The materials of Social Science are useful for general education at school level, before collegiate education starts so that pupils can learn them with sufficient ease and interest.
11. The content of Social Science are continuously growing and changing with the changing social process.
12. Social Science cover the study of communities at all levels, local, regional, national and international with focus on man and his social environment.
13. Social Science stresses contemporary human life and its problems rather than the past history of the man.

1.2.0 THE OBJECTIVES OF TEACHING THE SOCIAL SCIENCES AT THE SECONDARY STAGE

Given forth are the objectives of teaching Social Science at the secondary stage as specified in Position Paper by National Focus Group on Teaching of Social Sciences (2006).

To develop among the learner analytical and conceptual skills to enable him/ her:

1. to understand the processes of economic and social change and development with examples from modern and contemporary India and other parts of the world;
2. to critically examine social and economic issues and challenges like poverty, child labour, destitution, illiteracy, and various other dimensions of inequality;
3. to understand the rights and responsibilities of citizens in a democratic and secular society;
4. to understand the roles and responsibilities of the state in the fulfillment of constitutional obligations;
5. to understand the processes of change and development in India in relation to the world economy and polity; and
6. to appreciate the rights of local communities in relation to their environment, the judicious utilisation of resources, as well as the need for the conservation of the natural environment.

At the secondary stage, the Social Sciences comprise elements of History, Geography, Political Science, and Economics. The main focus will be on contemporary India and the learner will be initiated into a deeper understanding of the social and economic challenges facing the nation. In keeping with the epistemic shift proposed, contemporary India will be discussed from the multiple perspective and efforts should be made to relate the content as much as possible to the children's everyday lives.

Considering these importance and objectives of Social Science in the school curriculum, it can be said that it is a subject which can develop the child into a good social being. One of the subjects taught in Social Science as stated above is Geography which helps the children to understand their own earth, its characteristics and the interdependence of earth with the society. Geography has huge importance in the teaching of Social Studies.

1.3.0 TEACHING OF GEOGRAPHY

Robert E. Dickinson (1969) as stated on Geography World in What is Geography? defines "Geography is fundamentally the regional or chorological science of the surface of the earth." Geography by definition is a science which is concerned with the study and description of the earth. Wikipedia, the encyclopedia states word Geography is derived from Greek word "*geographia*", means "earth description". It is the science that studies the lands, the features, the inhabitants, and the phenomena of the Earth. Geography as a discipline can be split broadly into two main subsidiary fields: the Human Geography and the Physical Geography. The former largely focuses on the built environment and how humans create, view, manage, and influence space. The latter examines the natural environment, and how organisms, climate, soil, water, and landforms produce and interact. The difference between these approaches led to a third field, the Environmental Geography, which combines the Physical and the Human Geography, and looks at the interactions between the environment and humans. In 1984, the National Geographic Society, in partnership with the Association of American Geographers, developed the five themes of Geography: i) Location; ii) Place; iii) Human-Environment Interactions; iv) Movement; and v) Regions. Since then, textbook companies, educators, and researchers have used these themes in the construction and implementation of Geography curriculum materials. Adult studying Geography normally begins with the studies of the conditions on earth-of air, rock, soil conditions, for instance, and from these lead to their influence on man's habits of life. Its basic concepts are concepts of space. The modern Geography is an all-encompassing discipline that foremost seeks to understand the earth and all of its human and natural complexities-not merely where objects are, but how they have changed and come to be. Unambiguously "Geography is the study of the relationship between the man and the earth on which he lives." Geography has been called "the world discipline" and "the bridge between the Human and the Physical Science". Geography occupies a unique position in the school curriculum, standing as it does transitionally yet centrally between the Natural Sciences, the Social Sciences and the Humanities.

1.3.1 Importance of Geography

William Hughes (1863) as quoted in *The History of Geography* by Barker in 1963 stated "Mere place names are not Geography. To know by heart a whole gazetteer full of them would not, in itself, constitute anyone a geographer. Geography has higher aims than this: it seeks to classify phenomena (alike of the natural and of the political world insofar as it treats of the latter) to compare, to generalize, to ascend from effects to causes and in doing so to trace out the great laws of nature and to mark their influence upon man. In a word, Geography is a science, a thing not of mere names, but of argument and reason, of cause and effect".

As learnt Geography is the study of places on earth and their relationship with each other. Study of Geography begins with home community and expands as a person gains greater experience. Thus, Geography provides a conceptual link for children between home, school and the world beyond. Geographers study how people interact with the environment and with each other from place to place and they classify the earth into regions in order to draw generalizations about the complex world in which we live. Because it deals with where and how the people live, Geography is rich in material that relates to international understanding, multi-cultural concerns and environmental education. As the pace of change quickens, communications get faster and challenges to the environment multiply, knowledge and understanding of Geography becomes more vital than ever. Geographic knowledge is demanded for existence and progress in today's modern world that retrospect faster change with the utilization of the environmental resources in exhaustible manner, thereby affecting the natural balance on the earth. Individuals are expected to be sensitive and react wisely to the number of changes taking place in the physical and natural aspects on the earth. Improving geographical knowledge and skills is important to our nation and its future.

1.3.2 Importance of Teaching Geography in Social Science

Geography is a broad and integrative discipline. Geography makes both a distinctive and a wider contribution to the curriculum. It is an essential component in preparing young people for life in the twenty first century. Learning Geography helps students

develop curiosity in, and an understanding of, themselves, other people and places, and the relationships between them. Geographical education is indispensable to the development of responsible and active citizens in the present and future world. Geography can be an informing, enabling and stimulating subject at all levels in education, and contributes to a lifelong enjoyment and understanding of our world. Learners require global geographical awareness in order to ensure effective cooperation on a broad range of economic, political, cultural and environmental issues in a shrinking world. Moreover, Geography addresses the major challenges that the global community is facing. The resolution of major issues facing our world requires the full commitment of people of all generations. International Charter on Geographical Education published by Commission on Geographical Education (1992) states “All of the following issues have strong geographical dimensions at a variety of geographic scales like extreme natural events, global warming and climate change, deforestation, desertification, preservation of biodiversity, land use conflicts, soil erosion, atmospheric, soil and water pollution, use of non-renewable resources, sustainable economic activities, population dynamics and migration, urbanization, the processes and impacts of tourism, access to technology, access to education- especially literacy, global and local processes and patterns giving rise to poverty, unemployment, disease, crime, gender inequalities, ethnic conflicts, war, regionalism and nationalism.” In the context of these problems and issues facing humanity, the right to education includes the right to high quality geographical education that encourages both a balanced regional and national identity and a commitment to international and global understanding. Hence the proper transaction of the knowledge of Geography is important for all students. Alleged, the importance of teaching Geography enhances to students as it suffices Individual Educational Needs and provides opportunities to the following.

- Become aware of places and locations.
- Look at local, national and international events from a geographical perspective so they start to understand their location in regards to the space and environment surrounding them.
- Become conscious of the geographical features.

- Look at the local, national and international events, in a geographical context, so they start understanding first their local environment and then can spread their know-how to identify with other environments that lie further away.
- Understand the most important characteristics of the main physical systems of the world and the interaction between these systems.
- Understand the interactions that occur between human activities and the physical processes which include the causes by which society is influencing the state of the environment and vice-versa.
- Nurture love for the geographical environment.
- Foster love and respect for the group with whom they are working.
- Develop a dynamic and creative culture for all the aspects covered.
- Cultivate an interest in television programmes namely the news, the weather report, cultural and educational programmes, and programmes related to nature and science.

Canadian Council for Geography Education (n.d.) in The importance of Geography in School Curriculum as adopted from the pamphlet of National Council for Geography Education stated the following.

- Geography teaches students important skills: Through the study of Geography, students learn to read maps and interpret information at geographical scales, from local to global. They are able to use data from maps, tables, graphs and text to recognize patterns and solve problems. Students also can integrate concepts from many different areas of Science, Social Science and the Humanities and apply critical thinking to understand and deal with current issues of local, national and international importance.
- Geography helps students learn about the world: Knowing something about where the places are and what they are like is important. Citizens should have basic knowledge about the country and of the world as well and understand the international relationship.

- Geography contributes to international understanding: The world economies are increasingly linked in an international network of trade and exchange. Well planned geographic education at all grade levels will help to make us more aware of other countries and culture and prepare our students to take place in global community.
- Geography helps to understand our own country: (Geography and citizenship) Knowledge of Geography helps us to be the better citizens. Through Geography we can learn to locate important events. We can understand the relationship between Geography and national or international policies and we can use geographical knowledge to make informed decisions regarding the best use of the nation's resources. Finally, Geographic knowledge helps us to ask important questions about policies that lead to changes in landscape and land use. Geographically informed citizens will be effective leaders for our country.

Since geographic concepts and map skills are taught within the context of a multidisciplinary Social Science program, it is must to take care of and to insure the preservation of the unique features of Geography. Under no circumstances should basic geographic concepts and principles be violated even though they are being taught within a coordinated Social Science program. But the teaching of Geography in the school does not seem up to the mark. The Geography teacher actually teaches the lesson to the students that typically involve a combination of lecture, classroom discussion, readings, homework assignments, and any other types of activities aimed at teaching the students. After the lessons have been taught, examinations are typically administered by the teacher to ensure that students have learned what was taught and met the goals for the lesson or unit. Considering the importance and the nature of the subject, special care needs to be taken by the teachers while teaching the subject of Geography. The following paragraph presents the scenario of Geography teaching in the schools.

1.3.3 Present Scenario of Teaching Geography

Studies on present position of teaching Geography in secondary schools carried out by Jani (1987), Patil (1985) in Solapur and Khan (1985) in Bangladesh indicate 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, adhere to the lecture method. Necessity of teaching Geography with the help of audio-visual and other learning aids was ignored. Time factor at disposal in an academic year restricts the number of field trips and excursions. Lack of needed facilities and the required knowledge to teach the subject restricts the scope of teaching Geography. Unfortunately, it does not have a history of being well taught nor interesting for children. Similar review is given by Zevin (2000) stated that teachers depend on the textbook as their main source of ideas without much enrichment or supplementation from other sources. He also stated that they are used as part of a nearly closed system of assignments, reading, questions, homework and tests that provide security but little imagination. This is because of time-scarce teachers' need for quick, easy, readily available material.

Dervan, McCosker, MacDaniel, & O'Nuallain in *Educational Multimedia in Current Developments in Technology-Assisted Education* (2006) indicated "Despite society's awareness of the importance of education there has been less progress made in this vital area than in any other area of human endeavour for the last two millennia. Secondary education in particular still employs concentration, repetition and learning by rote as its principal educational tools and higher education remains dependent on the archaic toolset of lectures, laboratories, papers and exams. A major failing of today's educational system is its preoccupation with "what to learn" and ignorance of the more pertinent issue of "how to learn". The education system today is still deeply rooted in its origins and has not changed with the latest research into learning techniques.

Position Paper National Focus Group on Teaching of Social Sciences (2006) too remarked the usage of textbooks as the major source of knowledge and that fore

closed any possibility of innovation by an active participation of the learners both teachers and students.

The textbook-driven education system sees textbooks are an integral part of most education systems and serve as bridges between teachers and students. Our process to teach Geography is general routine, teacher centered and authoritative stressing upon rote learning. Part of the reasons for the generally ineffectual teaching of Geography in the schools has been the lack of an inadequate background which teachers themselves have had in Geography. This being the case, teachers have held closely to the class room text book. The programme of teaching topics in Geography consists of reading assignments from the “geographies” and simple exercises of the “name and locate” variety providing little space for learners thinking and reasoning. The learner thus accumulates a substantial amount of non-functional and unrelated facts which are promptly forgotten as it becomes very difficult for the children to link the provided knowledge to their life. Thereby making it ineffectual and boring for the students.

In the present world of hyper-technology, where change leads the life, a need to bring drastic changes in the way the knowledge of Geography is imparted to the children, has become crucial. Children have to be exposed to new approaches and methodology to transfer the knowledge of Geography for them to understand the Geography of the earth on which they live and to develop interest and attitude.

Two studies, that of D,Souza (1971) and Ponkshe (1983) deal with the Geography concepts and approaches to develop skill in teaching geographic concepts effectively. These represent a welcome trend towards a cognitive approach to the teaching of Geography. 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. An interesting attempt made by Bhattacharya (1984) through his study on the effectiveness of the concept attainment model and inductive model for teaching Geography and found that the models of teaching approach results in better achievement in Geography even in average and low-resource-status education institutions.

The National Curriculum Framework (2005) for school education recommends that children's life at the school must be linked to their life outside the school. This principle marks a departure from legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. The syllabi developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. The methods used for teaching and evaluation will also determine how effective the text book proves for making children's life at school a happy experience, rather than a source of stress or boredom. Treating the prescribed textbook as a sole basis of examination is one of the key reasons why other sources and sites of learning are ignored. Including creativity and initiative is possible if we perceive and treat children as participants in learning, not as receivers of fixed body of knowledge. These measures if adopted can take us in the direction of a child - centered system of education outlined in National Policy on Education (1986). Taking into consideration the above mentioned ideas the NCERT has published first edition of a "Text book in Geography for class IX" under the subject of "Social Science-Contemporary India-I" in March 2006 effective from academic year 2006-2007.

Position Paper National Focus Group on Teaching of Social Sciences (2006) states "Issues relating to Geography at secondary level should be taught keeping in mind the need to inculcate in the child a critical appreciation for conservation and environmental concerns. The textbook should be seen as opening up avenues for further enquiry. This would encourage the learner to go beyond the textbook, to further reading and observation."

For implementing the new syllabus of Geography fruitfully, there is a need to further look into the aims and objectives of teaching Geography, concepts of Geography, the approaches adopted and the methodology used to teach Geography and modify the method of teaching Geography with the help of latest multimedia technology according to the need of the present society to make it more effective and interesting.

1.3.4.0 Aims of Teaching Geography in Social Science

Geography today is no longer the Geography of learning-by-heart countries, capitals and crops. The subject matter is now far more topical, challenging and pertinent to the modern world. The modern Geography is an all-encompassing discipline that foremost seeks to understand the earth and all of its human and natural complexities—not merely where objects are, but how they have changed and come to be. Geography occupies a unique position in the school curriculum, standing as it does transitionally yet centrally between the Natural Sciences, the Social Sciences and the Humanities. The central purpose of our geographic content and skill program is the development of a system of procedures and of the basic tools which will foster a child's ability to observe, to analyze, to interpret, and to understand man's response to his physical and cultural environment. Hence it is very essential to generalize the aims of teaching Geography so that it can be taught to its optimum level.

The Geographical Association (n.d.) sees the aims of Geographical Education as follows.

1.3.4.1 Primary General Aims of Geographical Education

Knowledge

- Information about places and locations that enable students to view local, national and international activities within a geographical perspective.
- Information about geographical cycles and features, attributed to local, national and international situations, so that students will be able to view their geographical context.

Understanding

- Understanding of the most important characteristics of the main physical systems of the world and the interaction between these systems.

- Understanding the interactions that occur between human activities and physical processes, which include the causes by which society is influencing the state of the environment and vice-versa.

Skills

- Skills by which students are able to express themselves orally, artistically and by written format on geographical themes in a way that they are able to describe, note the basic similarities and differences between geographical features and aspects.
- Skills by which students are able to express themselves orally, artistically and in written format on geographical themes by being able to describe and discuss the interaction that exists between human organizations and geographical systems.
- Skills and the necessary know-how by which students will be able to carry out geographical studies, especially the interpretation of maps and fieldwork.

Attitudes

- Nurturing amongst children love and respect for the geographical environment.
- Fostering amongst the children love and respect towards the group with whom they are working.
- Developing amongst children a dynamic and creative culture in regards to all aspects mentioned above.
- Encouraging amongst children a growing interest in selected programmes on television namely the news, the weather report, educational and cultural programmes, programmes related to nature and science.

1.3.4.2 Secondary General Aims of Geographical Education

- To develop in young people knowledge and understanding of the place where they live in, of other people and places and of how people and places inter-relate and inter-connect; of the significance of location; of human and physical environments; of people-environment relationships; and of causes and consequences of change.

- To develop the skills needed to carry out geographical study e.g. geographical enquiry, map work and fieldwork.
- To simulate an interest in and encourage an appreciation of, the world around us.
- To develop an informed concern for the world around us and ability and willingness to take positive action, both locally and globally.
- To acquire an understanding of different communities and cultures throughout the world, develop an awareness of the contrasting opportunities and constraints presented by different environments.
- To foster an appreciation of environments, thereby enhancing a sense of responsibility for the care of the earth.
- To offer a range of skills and techniques in observing, selecting, analysing and presenting data.
- To gain the ability in using a wide range of geographical information in making judgments and reaching decisions.

1.3.5 Objectives of Teaching Geography in Social Science

NCERT in the year 2005 has underlined the following main objectives to be achieved through the teaching of Geography at standard IX.

1. To develop an understanding of man and environment interrelationship at the global level.
2. To develop an appreciation of the inter-dependence of nations and regions of the world.
3. To develop an understanding and concern about growing world population and its impact on environment.
4. To develop an understanding of the need for the protection of the environment and the conservation of nature and natural resources.
5. To develop an understanding that the economic development of a region depends on several factors, such as resources, level of scientific and technological-advancement and the needs and aspirations of the people.

6. To acquaint the students with the problems faced, by our country in the process of accelerating the pace of development of its national economy and the social transformation of its traditional society into a modern one.
7. To develop skills and abilities to read, understand and analyse geographical information and data presented in various forms such as photographs, maps, graphs, diagrams and charts, and
8. To equip the students with needed abilities and attitudes to study and analyse problems of development having geographical dimensions in a scientific manner.

Considering these objectives of teaching Geography, it can be said that innovative method and approaches are needed by the teachers to teach the subject effectively.

1.3.6.0 Different Methods and Approaches of Teaching Geography

Canadian Council for Geographic Education in *The Importance of Geography in the School Curriculum* emphasized the Geography classes should be equipped with proper equipment's like up to date globes, atlas and wall map of the world. It further stated a modern classroom must be equipped with one computer consisting appropriate and accurate programmes. There is a need to make the learning of Geography interesting and exciting for the students. There is a need to encourage teachers to use creative approaches and methods to teaching Geography.

1.3.6.1 Some Suggested Methods to Teach Geography

The following methods are suggested by the experts those can be used by the Geography teachers to teach Geography effectively according to the need of the specific topic and situation of teaching.

1. Descriptive method: based on personal experience, travel, letters, adventures, and diaries.
2. Text book method: teacher teaches with the help of the text book where the relevant pages are read either by the teacher or she/he asks the student to read those pages of the textbook to the class and teacher simultaneously explains the difficult terms, questions, etc.

3. Project method: 'whole hearted purposeful activity proceeding in a social environment'. Some activity pursued whole heartedly by a class working together with a definite purpose. A project should be piece of investigation leading to climax.
4. Regional Survey Method: based on the study of local Geography, and for the study of similar areas abroad.
5. Visual Aids Method: the use of cinematograph film, epidiascope, film strip. It includes on one end the pictures postcards or holiday snapshots and at the other end visual unit-combination of books, models, charts, film strips and films.

Field Study, Statistical method, The Broadcast lesson method, Assignment method, Discussion method, Laboratory method, Lecture method, Questioning method, Problem Solving method, Review method, Story-telling method, etc. are some more methods that can be adopted to teach Geography. However, this list of methods is not exhaustive. These methods can be used simultaneously for teaching a topic in Geography. The teacher might be guided by the choice of method, of approach by the amount of material he has at hand. Irrespective of the method used in the teaching of Geography, teachers are very important in the process of teaching Geography. Geography teaching would be effective if the following guiding principles will be kept in mind.

1.3.7 Guiding Principles in Teaching of Geography

Paul Robert Hanna (1966) in *Geography in the Teaching of Social Studies: Concepts and Skills* stated "...even relatively small parts of the earth's surface are beyond the range of the child's sensory experience. Hence their graphic representation on maps in a reduced form is an abstraction because it cannot be related to any such experience. This is one of the major problems of map reading. Because the reduction of areas on maps is difficult for the child to comprehend, map scales are correspondingly hard. Yet he must learn to read the map by scale and to understand the degree of reduction."

Rose Epstein Sabaroff (1957) in a framework for developing map skills in primary grades Social Studies stated “Children should not be allowed to get their first ideas of the appearance of a given kind of feature from the map. Introducing symbols of features children have not seen in real or pictured landscapes is one of the chief causes of failures to learn to read maps—that is, to read through them to the realities the map symbols represent.”

People do not study maps to understand maps. They study maps to understand the earth and its inhabitants. Every map symbol stands for something real. The Journal of Geography (2010) stated “A student has truly learned the meaning of a symbol only when he understands the real thing it stands for. With every new map symbol, the student gets a new understanding of the earth and of relationships between the earth and man.”

Paul Robert Hanna, et al. (1966) in *Geography in the Teaching of Social Studies: Concepts and Skills* stated “The two most valuable tools in this process of thinking and behaving geographically are the map and the globe. These tools need to be used to help organize geographic information and to show the areal distribution and relative density of both cultural and physical phenomena.”

Students need to have the opportunity to experience a range of activities in Geography, which are appropriate to their level of development, interests and abilities. New experiences cause students to refine their existing knowledge and ideas, so they construct new knowledge. The extent to which teachers are able to facilitate this process significantly affects how well students learn. It is important that they are given opportunities to relate their new learning to knowledge and skills, which they have developed in the past. Teachers should teach knowledge, skills and understanding in ways that match and challenge students’ abilities. Activities both within and outside the classroom are to be planned in a way that encourage full participation by all students, irrespective of ability. The teaching of Geography is now conceptually based with the emphasis on student involvement in problem solving, decision-making, data analysis, empathy and mapping. Geography is thus considered by many to be a life skill.

Considering these guidelines and suggestions of teaching Geography and Geography as a life skill, the Geography teacher has a great role to play in the process of teaching Geography. Imaginative, situation sensing and innovative teacher can help a lot in imparting the difficult concept of Geography to the students.

Gopsill (1966, p.18) in *The Teaching of Geography* describes the geographer's method of working as below.

1. To observe or to seek information.
2. To record what has been found.
3. To reason about these observations and to draw relevant conclusions from them.

He further says that the teachers function is “to direct this process- to make the sources available and to show children how to use them; to instruct in the most appropriate method of recording; and finally, to direct the interpretation, to point out obvious relationships and the conclusions which may be drawn from them, and to train children to make their own.”

A very useful *Handbook for Geography Teachers.*, edited by D.M. Forsaith (1932) states that one function of school Geography is to ‘help the child to adjust itself to the world as a whole through enlightened pictures of other peoples and races, leading to a sound and just international sentiment’.

This can be done by the means of presentation of enlightened pictures, descriptions, maps, accounts of adventure and travel, as well as films, postcard, drawings, photographs, etc. Collection of pictures is a Geography teacher's main material asset. The nature of the content of Geography demands a series of well-planned expeditions, leading to projects.

Krech and Crutchfield (1948) said that the Geography teacher must approach the task of helping the students to develop the ability to “think geographically” and to solve problems of relative location in differing cultural environment.

Catherine Jain & Arthur Getis (2003) in *Journal of Geography in Higher Education* stated the Role of the Teacher in teaching Geography.

Teachers can make Geography more accessible by focusing on the senses.

- They can improve access by: using materials and resources that students can experience and understand through sight, touch, sound, taste or smell.
- Organising activities to make up for a lack of first-hand experiences e.g. simulated environments, theatre, role play, reconstructions.
- Giving students first-hand experience of site visits and fieldwork and environmental walks.
- Adapting tasks and environments and providing other activities where necessary, e.g. using less detailed maps, tactile maps, models.
- Support from adults and others by giving students space and freedom to do things for themselves and allowing them time to respond.
- Geography can also be made more accessible through the usage of ICT, e.g. adapted switches, devices, Inclusive Technology Software, 2D and 3D Technology software and Optic Music, visual and other materials to help students develop their knowledge of their own surroundings and the wider world.

The technology now offers students a wealth of up to date Geographical information which allows students to analyze and utilize information from a wide range of subjects and fields. The use of technology can help a Geography teacher a lot in the process of teaching Geography. Latest modern technology along with traditional technology can add special feathers in the teachers' cap. Multimedia technology can help a lot in this direction.

1.4.0 MULTIMEDIA

Multimedia is a term frequently heard and discussed among educational technologists today. Unless clearly defined, the term can alternately mean a judicious mix of various mass media such as print, audio and video or it may mean the development of computer-based hardware and software packages produced on a mass scale and yet

allow individualized use and learning. In essence, multimedia merges multiple levels of learning into an educational tool that allows for diversity in curricula presentation.

1.4.1 History of Multimedia for Education

It was in the mid-1960s, when interactive computing came about, regarded as programmed instruction resulting in computer based training (CBT), and thereby a rather "behaviorist" approach to teaching. In the mid-1970s, Assisted Instructions came about, leading to the illusion of perfect Intelligent Tutoring Systems (ITS) capable of mastering all possible human misconceptions. Mid 1980s, was the time of hyper-text that had just caused frustration about "computers as teachers". Many believed that students need no guidance when acquainted with properly and perfectly prepared (hyper) structured information-learning material resulting in Explorative learning but failed, reasons attributed to insufficient spread. 1990 was the time of Multimedia and the Web. All three technological advancements (hypertext, multimedia, and the Web) were melded in the new term "E-Learning" claimed to be conquered by the Web and by multimedia. Soon it was realized that no solution was perfect, and that "we cannot abolish face-to-face teaching." So blended learning was invented. Various experiments revealed that above approaches have great value and can indeed improve teaching and learning. About four decades after the advent of programmed instruction, we see Computer Based Training CBTs and Web Based Training WBTs well established in forms of e-learning or educational multimedia. Hence it can be asserted that Educational Multimedia witnessed different phases and is defined in different ways by different people.

1.4.2 Meaning and Definition of Multimedia

Barron and Orwig (1995) "Multimedia can be loosely defined as computer-based technology integrating some, but not necessarily all, of the following: text, graphics, animation, sound, and video."

Bruder (1991) defined the term 'Multimedia' as the "coordinated combination of video, sound, text, animation, and graphics"

Rieber (1994) defines multimedia instruction as “integrated instructional systems that deliver a wide range of visual and verbal stimuli, usually through or in tandem with computer-based technologies”.

Fenrich (1997) “Multimedia is the exciting combination of computer hardware and software that allows you to integrate video, animation, audio, graphics, and text resources to develop effective representations on an affordable desktop computer.”

Phillips (1997) “Multimedia is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program.”

Krygier *et.al.* (1997) “Multimedia instruction includes text, images, maps, diagrams, sound, animation and video.”

Peck (1999) “Multimedia is a computer controlled combination of two or more media types to effectively create a sequence of events that will communicate an idea usually with both sound and visual support”

Elsom-Cook (2001) “Multimedia is the combination of a variety of communication channels into a coordinated communicative experience for which an integrated cross-channel language of interpretation does not exist.” This definition gives way for two approaches- one that is termed the “multiple-media” utilization, and the other in which a combination of different channels acquires unification as a medium.

Reddi (2003) “Multimedia can be defined as an integration of multiple media elements (audio, video, graphics, text, animation, etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media elements can provide individually”

Multimedia is known as computer-based applications involving non-linear representation of information using a variety of different representations and some level of user interactivity. And today's multimedia is a carefully woven combination of text, graphic art, sound, animation, and video elements. When you allow an end

user, i.e. the viewer of a multimedia project, to control 'what' and 'when' and 'how' of the elements that are delivered and presented, it becomes interactive multimedia.

Phillips (1997) “The term ‘interactive multimedia’ is a catch-all phrase to describe the new wave of computer software that primarily deals with the provision of information. The ‘multimedia’ component is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program. The ‘interactive’ component refers to the process of empowering the user to control the environment usually by a computer”

1.4.3 Importance & Uses of Multimedia

FAME 2010+ in article ‘The Evolution of Multimedia in Education’ (1996) stated “Multimedia not only impinges on individual learning, but also on the many functions of the education sector: teaching, development of teaching materials and pedagogies, teacher training, assessment of students and accreditation of course material. The education sector also has administrative needs, and teachers and establishments have to promote their services. Finally it affects the supporting service industry and other complementary sectors. The main modes of multimedia for education emerging seem to be: Broadcast instruction, Real-time conversation, CAL packages, Multimedia presentations, Multimedia reference, and Network information searching. However, the situation is still very fluid, with new lines of development yet to emerge. The basic CD multimedia product has emerged and will survive to 2010.”

Multimedia is seen with multipurpose uses. Some of the uses of multimedia includes the following.

- Drill and practice to master basic skills.
- The development of writing skill.
- Problem solving.
- Understanding abstract mathematics and science and Social Science concepts.
- Manipulation of data.

- Acquisition of computer skills for general purposes, and for business and vocational training.
- Access and communication to understand populations.
- Students access for teachers and students in remote locations.
- Individualized and cooperative learning, and
- Management and administration of classroom activities.

Researchers agree that the benefits of multimedia education surely exist for appropriate subjects and learning settings.

Stephen J. Snyder (1998) in *Research on Developments in Business Simulation and Experiential Learning: Multimedia and Student's Expectations* indicated many benefits of multimedia in classroom presentation. These benefits include aspects of learning, increased retention rates, and increased interest in the course. (Ng and Komiya 2000; Hofstetter, 1995) stated Multimedia has also been shown to elicit the highest rate of information retention and result in shorter learning time. Barth (1990) found that interactive multimedia computer lessons resulted in an 80 per cent retention rate, while lecture and associated visuals resulted in a mere 20 per cent retention rate in a sample of students. Research by Reinhardt (1995) specified that: (i) multimedia can boost curiosity, creativity, and teamwork amongst participants, (ii) multimedia can change the role of teacher from the traditional role of omniscient ruler to that of a tour guide, (iii) multimedia can increase access to information, (iv) multimedia can break down the wall of the classroom. Moore and Miller (1996) reported that students in introductory biology classes found multimedia attractive. Butler and Mautz (1996) found that students in a multimedia presentation consistently had more favorable impressions of the presentation than did students in a traditional lecture presentation. Luna and McKenzie (1997) obtained attitudinal surveys of students exposed to multimedia teaching methods. 73 percent of the students found multimedia to be a positive addition to the course, 64 percent preferred it to the traditional lecture method and 49 percent wanted to see more courses using multimedia. Similarly, 56 percent of the students reported "enjoying it" and 52 percent believed the multimedia elements improved the lecture. Miller and Moore

(1996) studied the effect of multimedia and found that multimedia raised attendance rates from 35 percent to over 90 percent, and that drop-out rates improved from 15.9 percent to 4.6 percent. With multimedia, the communication of the information can be done in a more effective manner and it can be an effective instructional medium for delivering information. A multi-sensory experience can be created for the audience, which, in turn, elicits positive attitudes toward the application. Rooze & Northrup (1989) found that computer-assisted instruction allows teachers to deliver the same material in a shorter period of time. With regard to information retention, a paper by Velleman and Moore, (1996) reviewing the strengths and weaknesses of using multimedia in teaching concluded that multimedia indeed has many potential benefits and that these benefits may vary based on educational level and ability – lower level ability receiving the most benefit concluded (Wetzel, Radtke and Stern, 1994). An article Multimedia as an Educational Tool (n.d.) states learners can work at own pace and control their learning path, learn from an infinitely patient tutor, actively pursue learning and receive, feedback and it allows teachers for creative work, saves time for more challenging topics, replaces ineffective learning activities, increases student contact time for discussion.(Agnew, Kellerman & Meyer, 1996) stated Multimedia application design offers new insights into the learning process of the designer and forces him or her to represent information and knowledge in a new and innovative way. Bruder (1991) suggests that an important benefit of multimedia is that it is fun to participate in as either a receiver or presenter of information.

Multimedia has obvious educational benefits when developed and used well. Adaptation of right choice of media according to the subject to be conveyed and/or the recipient can lead to better learning. This demands the developer of multimedia to be aware of some characteristics of learner and principles of multimedia.

1.4.4.0 Guiding Psychological Phenomena for Development of Multimedia

Gardner (1983) in Multiple Intelligence Theory asserted that humans actually learn through many different cognitive styles. The theory consists of seven types of intelligence: bodily-kinesthetic, interpersonal, intrapersonal, linguistic, logical-mathematical, musical and spatial. If humans learn through multiple types of

intelligence, then the most effective instructional media would appeal to many or all of them. The challenge that educators face is how to deliver learning materials to people with varying modes of learning i.e. intelligences. Using teaching techniques that match the individuals preferred learning style makes learning a more natural experience. If learning becomes natural, then it becomes easier, faster, fun and more successful.

Bernice McCarthy (1987) in book 'The 4-Mat System' identifies four distinct types of learner.

1. The Innovative learner- who is imaginative and relates new information to her or his own experiences.
2. The Common Sense learner- who wants realistic examples relevant to real life.
3. The Dynamic learner- who wants to learn by actual involvement and specific experiences.
4. The Analytical learner- who wants to see the principles and concepts behind the subject.

The first three learner types are all natural right brain learners who will prefer a visual and kinesthetic approach. The only natural left brain learners are the analytical learners, who find it comfortable to be verbal and logical and have an auditory presentation of information.

S. Dervan et. al. in *Current Developments in Technology-Assisted Education* (2006) stated "Modern learning theory such as Accelerated Learning is guided by more than a decade of psychological research on the inner workings of the human brain. We have learned that humans have several forms of intelligence instead of a single static IQ and individual learning styles are largely dependent on this diversity. A learner's dominant sensory system, i.e. visual, auditory or kinesthetic, also plays a major role in determining their natural learning style. If the teaching style employed closely matches this preferred style, learning becomes more natural and thereby easier so consequently results improve and learning time is reduced. Evolving multimedia technologies can be used to forge stimulation, which supports multiple learning styles

as they present a wide range of graphical, textual and aural sources.” How to involve technology in the best way considering the changes taking place in it demands us to focus on the principles to design multimedia.

1.4.4.1 Principles to Design Multimedia

Peter Doolittle et.al. (n.d.) stated, Individuals learn, retain, and transfer information better when following aspects are taken into consideration.

- When the instructional environment involves words and pictures rather than words or pictures alone (Multimedia Principle).
- When the instructional environment involves auditory narration and animation rather than on-screen text and animation (Modality Principle).
- When the instructional environment involves narration and animation rather than on-screen text, narration, and animation (Redundancy Principle).
- When the instructional environment is free of extraneous words, pictures, and sounds (Coherence Principle).
- When the instructional environment involves cues, or signals, that guide an individual’s attention and processing during a multimedia presentation (Signaling Principle).
- Where words or narration and pictures or narration are presented simultaneously in time and space (Contiguity Principle).
- Where individuals experience concurrent narration and animation in short, user-controlled segments, rather than as a longer continuous presentation (Segmentation Principle).

The "Principles of multimedia learning" advocated by Richard Mayer & Ruth Clark based primarily on Mayer's research (2001), Clark and Mayer (2003) that provide the following overview of multimedia principles and their effect on learning are explained forth.

1. **Multimedia Principle:** Talks about best use of words & pictures. Adding graphics to words can improve learning. Students learn better from words and pictures, rather than from words alone.
2. **Modality Principle:** “Materials which present both verbal and graphical information should present the verbal information in an auditory format (and not as written text)”. It refers to one of several design principles for multimedia instruction and states best use of visual and auditory channels. Explaining graphics with audio improves learning. Students learn better from animation and narration, than from animation and just on-screen text.
3. **Split attention effect (Redundancy Principle):** "Students learn better from animation and narration than from animation, narration, and on-screen text." It states best use of text and audio. Explaining graphics with audio and redundant text can hurt learning. Thus it is better to eliminate redundant material. Avoid reading on-screen text. Students learn better from animation and narration, than from animation, narration, and on-screen text. Learners do not learn as well when they both hear and see the same verbal message during a presentation. This is a special case of the split attention effect of Sweller and Chandler.
4. **Spatial Contiguity Principle:** "Students learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen." i.e. best placement of words & pictures. Placing text near graphics improves learning.
5. **Temporal Contiguity Principle:** "Students learn better when corresponding words and pictures are presented simultaneously rather than successively." i.e. best sequencing of words & pictures.
6. **Coherence Principle:** "Students learn better when extraneous material is excluded rather than included." Less is more. Using gratuitous visuals, text, and sounds can hurt learning.
 - **Visual:** Student learning is hurt when interesting but irrelevant words and pictures are added to a multimedia presentation.
 - **Sound:** Student learning is hurt when interesting but irrelevant sounds and music are added to a multimedia presentation.

- Words: Student learning is improved when unneeded words are eliminated from a multimedia presentation.
7. Individual Differences Principle: "Design effects are stronger for low-knowledge learners than for high knowledge learners, and for high-spatial learners rather than for low-spatial learners." It demands best use of prior knowledge. These learners are equipped to use cognitive strategy to work around cognitive overload, distraction, or other effects of poor design.
 8. Practice: Talks about best interactions for learning: Frequent, distributed, problem-solving, job-context practice improves learning and transfer.
 9. Learner Control vs. Program Control: It talks about best navigation scheme. Most students learn more under program control. Adult learners require a sense of control to be able to establish a self-paced learning process.
 10. Personalization: It is concerned with engaging the learner. Use of conversational tone and pedagogical agents can increase learning.

Ruth Clark has emphasized that graphic technique can be used to specifically support learning of different types of content presentation. Given forth is the table of Graphic Techniques, recommended by Ruth Clark to specifically support learning of different types of content presentation.

Table 1.1: Ruth Clark Graphic Techniques to Specifically Support Learning of Different Types of Content Presentation

| Content Type | Graphic Support | Examples |
|---------------------|--|---|
| Fact | Realistic illustrations of specific forms, screens, and equipment | Illustration of a software screen |
| Concept | Realistic illustrations of multiple examples of a concept | Pictures of excellent web pages to illustrate the concept of what makes an effective web page |
| Process | Animated diagrams illustrating stages of process | Activities in a computer network |
| Procedure | Video or animated demonstrations of near-transfer task being performed | Animation of how to use a software application |
| Principle | Video or diagrams of far-transfer tasks being performed | Video of effective sales closing techniques |

Clark and Mayer (2003) offered the following recommendations for graphic support.

Table 1.2: Clark's and Mayer's Recommendations for Graphic Support

| Knowledge Structures & Graphic Support | | | |
|---|--|-------------------------------|--|
| Type of Cognitive Structure | Description | Graphic Representation | Example |
| Process | Explain a cause-and-effect chain. | Flow chart | Explanation of how the human ear works. |
| Comparison | Compare and contrast two or more elements along several dimensions | Matrix | Comparison of two theories of learning with respect to nature of the learner, teacher, and instructional methods |
| Generalization | Describe main idea and supporting details | Branching tree | Presentation of thesis for the major causes of the American Civil War along with evidence |
| Enumeration | Present a list of items | List | List of the names of seven principles of multimedia design |
| Table Classification | Analyze a domain into sets and subsets | Hierarchy | Description of a biological classification system for sea animals |

Table 1.3: Clark’s and Mayer’s General Multimedia Design Principles for Text and Illustrations

| | |
|-----------------------|---|
| Concentrated | The key ideas are highlighted in the illustrations and in the text |
| Concise | Extraneous descriptions are minimized in the text and extraneous visual features are minimized in the illustrations |
| Correspondent | Corresponding illustrations and text segments are presented near each other on the page |
| Concrete | The text and illustrations are presented in ways that allow for easy visualization |
| Coherent | The presented material has a clear structure (e.g., a cause-and-effect chain) |
| Comprehensible | The text and illustrations are presented in ways that are familiar and allow the learner to apply relevant past experience |
| Codable | Key terms used in the text and key features of the illustration are used consistently and in ways that make them more memorable |

1.4.5.0 Multimedia for Teaching Purpose

Multimedia is a rapidly evolving technology that is bridging the gap between reality and magic. It involves the integration of different media such as text, sound, video, two dimensional (2D), and three dimensional (3D) graphics and animation, with a capacity for user interaction with Multimedia product. Learning is a cross-sensory experience that requires a lot more imagination. There is thus an absolute need for graphics and animation to help the learners understand “difficult” subjects that rely heavily on imagination. For education the 2D and 3D animation is making it possible for more individuals than ever to access knowledge and learn in new and different ways. Video communication was found useful in explaining and demonstrating the

process part of teaching. At the dawn of 21st century, the education landscape is changing. Universities, Colleges and Schools are experiencing growing enrollments responding to demands for higher standards. Animation is enabling us to address these educational challenges, bringing learning to the students instead of bringing students to learning. It is allowing for the creation to teach creativity that defines the constraints of the time and distance as it provides access to knowledge that was once difficult to obtain. The application of multimedia in teaching makes teaching methods, teaching concepts and forms, teaching structure, as well as theories change as according to Elsie Nanji, “Multimedia is a natural extension of a creative mind. It helps you harness the potential of ideas.” Roger Slack (1999) in *PEDACTICE: The Use of Multimedia in Schools* stated the growth of information and communication technology (ICT) in society is reflected in policies to encourage the use of ICT in education and the development of educational multimedia.”

1.4.5.1 Scenario of the Use of Multimedia in Educational Institutions

With the development of modern technology, multimedia has entered into teaching and had quick development. If we look at the situation in today's educational institutions, we can observe that technology-augmented classroom teaching indeed have become established parts of everyday teaching and learning. Groves and Zemel (2000). Acceptance and use of multimedia in the classroom has reached the point today that suggests, multimedia is critically important to teaching. Today, multimedia technologies application has come true. The use of various media in the classroom has been observed and examined as to their impact on educational outcomes for nearly 100 years. Research and development performed in the last couple of years created tools and systems for Computer technology for teaching that varies from subject to subject and from teacher to teacher and studied, evaluated, and established useful usage scenarios. Use of technology in the classroom has seen many changes from such things as slides and silent film, motion pictures with sound, television, interactive computer-assisted instruction, to internet and digital-based multimedia presentations. However, in general, three approaches have reached a prominent position in the field of computer-supported education today: Extensive use of digital

slide-show presentations, the utilization of educational mini-applications (for example specialized software, dynamic Web pages, or Java Applets), and recording (for example via traditional videotaping or automatic screen capturing) and/or transmission of classroom lectures. Recording a video of the entire lecture showing the board, the lecturer, and featuring an audio track enables students to follow a lecture remotely and to recall previous sessions. Recently these have also begun to be published as podcasts, enabling learners to use the materials even on their mobile audio devices. Computer usage in the classroom is no longer restricted to the lecturer, but many students have notebook computers which can be included in the learning process. Smaller mobile devices such as PDAs or cell phones are becoming more and more powerful and ubiquitous. Better pen-based interfaces and screens are becoming available. Question is how educational content should be presented, deployed, navigated, searched, retrieved, edited, combined, exchanged, and reused in an appropriate and proper way to make learning of particular subject effective.

1.4.6 Importance of Multimedia for Teaching Geography

According to Trollip and Alessi (1988) “one of the purposes of adding computers to classroom instruction is to facilitate learning for students by improving the quality and quantity of what they know. Computer technology plays a critical role in the discipline of Geography.” McCormick *et al.* (1987, as cited by Couclelis, 1998) stated that human beings have a natural ability to process visual information quickly and efficiently. (Fitzpatrick, 1990) stated “Computers can both quicken and enrich Geography instruction”. Francis Dwyer (1978) found that pictures help young adults learn when they are optimally realistic, when sufficient time is given to interpret them and, in the case of instructional books, when text alone would not be as effective. Klein (1987) in comparing animated images with static images finds that animation is distinguished in the ability to demonstrate changes in both movement and direction. Therefore, animation can reduce abstraction in temporal concepts and better display changes over time. The evidence suggests that animated imagery may play an important role in physical Geography education being more abstract in nature. Strahler & Strahler (1987, p. 1) stated “A physical geographer should consider the

earth in terms of flow systems of matter and energy, each consisting of connected pathways through which matter, or energy, or both move continuously”. Accordingly, continuous movement over space and time is better illustrated by animated rather than static images. Gold *et al.* (1991) Computer programs that produce animated simulations are considered ideal in demonstrating physical processes such as sediment transport and deposition and other concepts. Mayer and Gallini (1990), basing their conclusions in dual-coding theory, states that the concurrent presentation of verbal and visual information allows students to build connections between the two. MacEachren & Ganter, (1990) reported that visualisation is an increasingly used term in Geography that refers to both the ability to process visual information and the design of concrete visual representations meant to assist such processing. Both must be understood to evaluate the relative importance of visual representation in geographic education. (Halocha, 2002; Taylor, 2003) opine that ICT enables teachers to engage and motivate pupils about geographical concepts to a greater degree. (Freundschuh & Hellevik, 1999) reported in a study in which students learned about changing agricultural patterns using multimedia and animated maps where the students found multimedia to be more interesting and fun to use than traditional text-based learning.

1.4.7 Multimedia Packages in Teaching of Geography

Education has always acknowledged versatility and efficiency of multi-media communications. Multimedia does not necessarily require computers. For example, geographic educators often combine the use of slides, overheads, chalkboards, movies, videos, and sound recordings in their lectures and academic presentations. Further, atlases have a long tradition of integrating text, images, maps, diagrams, and graphs. Thus the multimedia concept is not completely new to geographers. But now, one may say that the movement of educational technology is multi-media based with computers as referred and substantiated above. Now has come the time to make use of computer based multimedia packages in the field of education to make teaching-learning process more effective and interesting. Multimedia is regarded as more than mere technology by Researchers. The typical design of multimedia is an array of

representational forms (e.g. image, map, diagram, sound, video). Multimedia is getting equipped with an array of computers, software, network connections, and projection equipment. Geography is one curricular area that has really gained from computer technology and further can gain. Sound, movement, colour and lots of ways to present the facts come alive with computers and make Geography instruction exciting and fulfilling. In order to improve the effectiveness and efficiency of teaching in Geography, application of computer based multimedia technology is inevitable to get best results as no longer teaching Geography is learning-by-heart countries, capitals and crops. The subject matter is now far more topical, challenging and pertinent to the modern world. But many teachers of Geography appear to prefer the still pictures, as in the film strip, to the moving pictures. Is there any value in movement as in cine film in the teaching of Geography? The value lies precisely in the implication of the word 'movement'. If we wish to help the children to grasp the human aspect of the relationship between man and his home, the earth, the moving pictures is of greater value than the still, though both have their place. Moreover the excitement inherent in the movement acts as a stimulus to imagination and hence helps to extend experience. (Ofsted, 2004a) Geography provides a rich and varied context for the use of new technologies to enhance both learning in the subject and to reinforce existing ICT skills. It can help pupils investigate, organize, edit and present geographical information in many different ways. In Geography, ICT can help pupils in various ways.

- To enhance geographical knowledge and improve geographical enquiry skills.
- To develop graphical, statistical and spatial analysis skills.
- To develop mapping skills.
- To experience alternative images of people, places and environments and how environments change.
- To simulate or model geographical systems and environments.
- To communicate with other pupils in contrasting localities by email, webcams and video conferencing.
- To improve the appearance of work by enhancing presentation.
- To increase awareness of the impact of ICT in the changing world.

Fitzpatrick (1993) also asserts that multimedia is particularly appropriate for Geographic education since Geographic concepts should be learned through text, maps, pictures and sound to achieve the fullest learning experience. Arthur C. Clake on emphasizing the importance of technology stated “Any sufficiently advanced technology is indistinguishable from magic”. The kind of multimedia packages developed can bring in life animation to simulate the learner’s imaginations and make learning an easy process. The CD-ROMs can be prepared by subject experts and multimedia professionals, to fill this vital need. The textbook can be accompanied with the CD-ROM that can be written in crisp, elegant and simple language to facilitate the learning process. Readily available CD may not suffice the purpose of teaching learning. Tailor made packages according to the need of syllabus can prove to be more worthy. Though Indian Schools have started the involvement of such packages in schools but are insufficient according to the requirement. There is scope for teachers to initiate the development of such multimedia packages. Looking at its prospects the NCERT included media like television and radio in a well-knit package for training of primary teachers in teaching Social Science and extended it to a large number of teachers in the early of 1975-76. Even the Central government has initiated various measures to promote 2D and 3D animation in various spheres of Government & Education bodies. So, hardly one can deny the fact that a computer animation program offering flexibility, international quality inputs and cost effectiveness has become imperative to cater the needs of the society.

Considering these scope of technology particularly, multimedia technology in the field of teaching Geography, the researcher is taking the help of multimedia technology in preparing a package to teach Geography to standard IX CBSE students.

1.5.0 RATIONALE OF THE STUDY

Social Studies, is the study of society and its aim is to help pupils to understand world in which they have to live and how it came to be, so that they may become responsible citizens. It aims at promoting critical thinking and a readiness for social change, at creating a disposition for acting on behalf of the general welfare, at an appreciation of other cultures and a realization of the inter-dependence of man and

nation. The subject of the Social Studies which deals directly with man and the society in which he lives, carries special responsibility of preparing young children to become well informed, constructive participants in society and capable of developing healthy social relationships. Social Studies helps students to develop social relationship, social efficiency, objective attitude, citizenship training, constructive and critical thinking, integrated knowledge, intelligent understanding, adaptability, appreciation of other's view point, learning, sensitiveness to social issues, tolerance, unbiased attitude, devotion to ideas, inter-relationships, emotional balance, self-discipline, social attitude among students. The development of these values and attributes among students can lead the civilization to prosperity, particularly, at this time of crisis and problems worldwide.

Geography, a part of Social Studies, is a science concerned with the study and description of the earth. It is the study of the relationship between the man and the earth on which he lives. Geographic knowledge is increasingly important for survival and progress in today's world. Especially in the modern world where the growth is taking at a faster pace making use of the environmental resources, those environmental resources which are non-renewable in nature thereby affecting the natural balance on the earth. As a result of this number of changes are taking place in the physical and natural aspects on the earth about which an individual should be made aware of. Moreover, it is also observed that most of teachers of Geography mostly use the lecture method in teaching Geography. Audio-visual teaching and learning aids, including maps, are not considered necessary and are not used in classes. Field trips and excursions are found limited usage in both urban and rural schools. This has made the subject of Geography boring for the students in terms of both teaching and learning making the subject uninteresting and hence decreasing the motivation level of students towards learning of these subjects. There is a vast gap in the way the knowledge of Geography is imparted to the children and in the way it should be imparted looking into the demand of today's world of technology so that the children develop interest and attitude in gaining the knowledge of Geography and understand the Geography of the earth on which they live. All these factors accumulated to create an adverse attitude towards the learning of this subject. With

the deepening of the curriculum reform, teachers teaching the original concepts and teaching methods, has been far behind the times. New teaching model is clear to us to actively explore the modern teaching methods. In the present world of technology, where growth is accelerating at a faster pace, need has felt to bring drastic changes in the way the knowledge of Geography is imparted to the children. The present study is an attempt in this direction to experiment an interesting mode of technology to improve the teaching learning process of Geography among students using multimedia technology.

Education has always acknowledged versatility and efficiency of multi-media communications. Mixing face-to-face teaching, self-learning, use of audio-visual aids and do-it-yourself activities has been part of this understanding. Multimedia is a rapidly evolving technology that is bridging the gap between reality and magic. Multimedia has revolutionized every aspect of life around us and is fast gaining acceptance in the shape of careers. Multimedia is a natural extension of a creative mind. It helps you harness the potential of ideas. Multimedia package can be presented as an interactive, ready-reference and learner-centered multimedia tool and cater to all levels of education. These user-friendly packages can be developed that will include a wide variety of animation, graphics and video clippings, etc. Multimedia teaching methods are in a unique advantage into the schools, into the classroom, with its distinctive teaching characteristics, so that the classroom is more colourful. Multimedia instruction uses motion, voice and music, text, graphics, video and still images, to enhance learning by stimulating multiple sensory organs simultaneously. When combined, these tools enable the elegant explanation and enhanced comprehension of learning objects. Studies focused on the effectiveness of multimedia education have proven that multi-media learning resources are often more effective than text-only resources, particularly when the learner is introduced to completely new material. When utilised properly in conjunction with text-based information, images have been proven to enhance motivation, attention, comprehension and recall. Studies have concurred that people retain only 20 percentage of what they see but they remember as much as 80 percentage of what they see, hear, and do simultaneously. Multimedia technologies offer high-tech

support for a range of visual, textual and aural sources, which complement the Accelerated Learning method. Using a variety of media to present information caters for more learning styles. Multimedia technology can maximise the potential of the learner's intelligences and improve their quality of learning, e.g. hands-on interactivity enhances the kinesthetic intelligence; logical / mathematical intelligences can be maximized through problem-solving. No matter what one's intelligence, multimedia presentations trigger visualization strategies such as mental imagery, which is crucial to many kinds of problem solving and retention.

The review of related studies reveals no studies were found by the researcher in India related to the development of multimedia packages in teaching of Geography at secondary level except one study done by Idayavani (1991) developing video programme in Physical Geography for higher secondary students. The researcher has come across only this studies which would help to understand the area of teaching Geography through Multimedia Packages developed with the use of computer technology and other media. A very useful handbook for teachers of Geography, edited by D. Forsaith, states that one function of school Geography is to 'help the child to adjust itself to...the world as a whole through enlightened pictures of other peoples and races, leading to a sound and just international sentiment'. This can be done by the means of presentation of enlightened pictures, descriptions, maps, accounts of adventure and travel, as well as films, postcard, drawings, photographs, etc. The nature of the content of Geography demands a series of well-planned expeditions, leading to projects as they become abstract in nature when explained verbally. But if more of field trips and excursions are planned, then it becomes more time consuming. Here, multimedia packages developed with the integration of different media such as text, sound, video, images, two dimensional (2D) and three dimensional (3D) graphics and animation; coupled with the power of interactive digital technology to offer information with impact, can be effectively used for those topics especially which requires more of imaginations or field visits. It bears the capacity to make abstract world be felt real to the students. In Geography teaching, usage of multimedia technology can create teaching situation, students from the multi-faceted sensory stimulation system can be catered with, can help to stimulate students

interest in learning, cultivate noble character, create a good moral character, increase classroom capacity, the development of intelligent students to develop their comprehensive ability, can contribute to improve the vitality of Geography teaching, and promote overall development of students in an effective way.

Standard IX is the crucial standard of secondary education which is needed to be sound for secondary examination at standard X and that to lead a discipline and career in higher/senior secondary stage. Being a practitioner teacher of Geography in Central Board of Secondary Education for the last fifteen years, the researcher felt the need for using technology in teaching-learning of Geography so as to take care of the limitation of Human Teacher in the same.

The proposed study is an attempt in this direction to develop a multimedia package on Geography to teach standard IX CBSE students considering these research questions in mind.

1.6.0 RESEARCH QUESTIONS

In the process of formulating the present research study, the following research questions came in the mind of the researcher. The researcher will try to get the answer of these research questions in the process of this research work.

- Whether multimedia in computer can be used for effective teaching of Geography?
- Whether students studying Geography through multimedia do better in comparison to the students studying the same through traditional method?

1.7.0 STATEMENT OF THE PROBLEM

DEVELOPMENT AND IMPLEMENTATION OF MULTIMEDIA PACKAGE TO TEACH GEOGRAPHY TO STANDARD IX CBSE STUDENTS

1.8.0 OBJECTIVES OF THE STUDY

The present study is designed with the following objectives.

1. To develop a multimedia package in subject of Geography for standard IX CBSE students.
2. To implement the developed multimedia package for teaching Geography to standard IX CBSE students.
3. To study the effectiveness of multimedia package in the terms of achievement of students.
4. To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.

1.9.0 HYPOTHESIS

The following hypothesis is formed which will be tested at 0.01 level of significance.

There will be no significant difference in the mean achievement score of Geography of control group and experimental group students.

1.10.0 DEFINITION OF TERMS

Following term is defined in the present study by the researcher pertaining to the present study.

Multimedia Package: For the present study the multimedia package is defined as a computer based package that includes the integration of different media such as, text, sound, video, images of two dimensional forms, simulations and animations to offer information with impact.

1.11.0 OPERATIONAL DEFINITION OF TERMS

Following terms are operationally defined in the present study.

Achievement in Geography: Achievement in Geography is the marks obtained by the students of standard IX in the subject of Geography in the achievement test constructed by the investigator.

Reactions of Students: The scale value of the preferred belief of the students regarding the component of the developed multimedia package on a five point-scale is considered as the reaction of the students towards the component of the multimedia package. The aggregate qualitative scale value is considered as the overall reaction towards the developed multimedia package.

1.12.0 DELIMITATION OF THE STUDY

The present study is delimited to all the six units of standard IX (Social Science) Geography textbook titled 'Social Science Contemporary India-I Textbook in Geography for Class IX' prepared and published by NCERT, New Delhi in March 2006, reprinted in January 2010 and which is prescribed by Central Board of Secondary Education for the execution of syllabus in CBSE affiliated schools. These units are (i) India–Size and Location (ii) Physical Features of India (iii) Drainage (iv) Climate (v) Natural Vegetation and Wild Life and (vi) Population.

1.13.0 SCHEME OF CHAPTERIZATIONS

Chapter I deals with the Conceptual Framework of the Present Research Problem, Research Questions, Rational of the Study, Statement of the Problem, Objectives of the Study, Hypotheses, Definition of Terms, Operational Definition of Terms and the Delimitation of the Study.

Chapter II deals with the Review of the Related Literature and the Implication of the Reviewed Literature for the present study.

Chapter III focuses on the Methodology of the Study which includes Design of the Study, Population and Sample of the Study. Tools used for Data Collection, Development of Multimedia Package, Procedure of Data Collection and Techniques of Data Analysis.

Chapter IV includes details of analysis, interpretation of the collected data and discussion.

Chapter V deals with the Summary of the whole study.

CHAPTER II

REVIEW OF RELATED LITERATURE

| Caption no. | Particulars |
|-------------|--|
| 2.0.0 | INTRODUCTION |
| 2.1.0 | REVIEW OF THE RELATED LITERATURE CONDUCTED IN INDIA |
| 2.1.1 | Researches on Teaching Geography and Social Science |
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| 2.1.4.1 | Observations of Researches from Indian Studies in the Area of Geography. |
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| 2.2.0 | REVIEW OF THE RELATED LITERATURE CONDUCTED ABROAD |
| 2.2.1 | Researches on Teaching Social Science and / or Geography Conducted Abroad |
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| 2.2.3 | Researches on Teaching Geography Through Multimedia Package and / or CAI |
| 2.2.4.0 | Observations of Researches from Abroad |
| 2.2.4.1 | Observations of Researches in the Area of Geography Conducted Abroad. |
| 2.2.4.2 | Observations of Researches in the Area of Computer Based Multimedia Package and/or CAI Conducted Abroad. |
| 2.3.0 | IMPLICATION OF REVIEW OF RELATED STUDIES FOR THE PRESENT STUDY |

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 varied 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, Shirampur 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 dully 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 Raven'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 than 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 opening 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 eight 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.

CHAPTER III

METHODOLOGY

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CHAPTER III

METHODOLOGY

3.0.0 INTRODUCTION

The central aspect of any research is embodied in its methodology that shares the idea about how the study was conducted. The nature, plan and procedure of the study are the core elements in the scope of methodology. It is recommended and enviable that research plan be designed and laid out in its most appropriate and methodological way. Research outcomes can be justified as more authentic and reliable ones when requisite and appropriate methodology is implemented. This chapter is methodology oriented where the researcher has concentrated on the steps and process adopted in order to attain the objectives of the present study. The present study is an experimental study. Quantitative research methodology is adopted for the present study being embraced by experimental study. The present chapter encompasses the research design for the study, the population, the sample, the tools and the techniques used for collection of data, and the procedure of data analysis. For comprehensive understanding of the methodology of the present study, the objectives and hypothesis of the present study are cited below.

3.1.0 OBJECTIVES OF THE STUDY

The present study was designed with the following objectives.

1. To develop a multimedia package in subject of Geography for standard IX CBSE students.
2. To implement the developed multimedia package for teaching Geography to standard IX CBSE students.
3. To study the effectiveness of multimedia package in the terms of achievement of students.
4. To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.

3.2.0 HYPOTHESIS OF THE STUDY

The following hypothesis was formed which was tested at 0.01 level of significance.

There will be no significant difference in the mean achievement score of Geography of control group and experimental group students.

3.3.0 METHODOLOGY

For the present study the investigator adopted experimental design, so the methodology and the process of experimental research were adhered to attain the objectives of the present study. Exhaustive methodological procedures is described together with the research design, the population, the samples, the tools for data collection, the development of multimedia package for teaching Geography, procedure of data collection and data analysis.

3.3.1 Design of the Study

The present study is experimental in its nature. As the sample for the present study was selected purposively, Quasi-experimental research design was adopted. Pre-test post-test nonequivalent group design was chosen for the present research as Best and Kahn (1996) describes, '*this design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes, which may be similar*'. The researcher did the real-time experiment for the present study, where it was difficult to use randomization for the selection of samples for experimentation and thus the researcher took the sample purposively. This leads the researcher to take the help of the Quasi-Experimental Design study instead of True-Experimental Design. The experimental design of the present study is presented as follow.

O₁ X O₂

O₃ C O₄

Where,

O₁ and O₃ are pre-test

O₂ and O₄ are post-test

X stands for Experimental Group and

C stands for Control Group

The mentioned design was followed in the process of experiment with the objective of studying the effectiveness of multimedia package in Geography. With the help of pre-test and post-test, the achievement of standard IX students of CBSE affiliated schools in Geography was measured before and after the experimentation respectively for both the experimental and control group.

3.3.2 Population of the Study

All the standard IX students studying in CBSE affiliated English medium schools of Gujarat in the year 2011-12 constituted as the population for the present study. There were a total of 232 CBSE affiliated secondary schools and 14665 standard IX students in those CBSE affiliated schools in Gujarat for the year 2011-12. (Derived data as per students enrollment done in standard IX in Gujarat for the X AISSE board examination that was to be conducted by CBSE for year 2012-13.)

3.3.3 Sample of the Study

Sample for the present study were selected purposively considering the experimental nature of the present study and bearing in mind the feasibility aspect of the experimentation, data collection and with the objective of getting all the required facilities and the researcher's convenience. Two CBSE affiliated secondary schools of Surat city were taken purposively as the sample school for the present study. The P.P. Savani Chaitanya Vidya Sankul, Abrama, Surat was considered as the school for experimental group and Radiant English Academy, Piplod, Surat was taken as the school for controlled group. Again, section A of standard IX of the P.P. Savani Chaitanya Vidya Sankul, Abrama, Surat was considered as the sample group for

experimental group and section A of standard IX of the Radiant English Academy, Piplod, Surat was taken as the sample group for the controlled group. There were 35 and 37 students in the sample of experimental and control groups respectively. Pre-achievement test in Geography was administered to both control group and experimental group and students of both the groups were assigned marks in Geography i.e. pre-test achievement score. With equal marks in the pre-test achievement test, one-one students were assigned to control group and experimental group. In this process 30 pair of students were found out and accordingly 30 students each were assigned to control group and experimental group. In terms of pre-test score the group of these 30 students can be called as equivalent groups having same group statistics like Mean, Standard Deviation and Standard Error of Mean. In this process, 30 students were segregated in each of control group and experimental group. Hence, the sample comprised of 30 standard IX students of CBSE affiliated schools for experimental group and an equivalent 30 standard IX students of CBSE affiliated schools for control group.

3.3.4 Tools for Data Collection

In the process of attainment of the objectives for the present study, an achievement test in Geography and a reaction scale were constructed by the researcher. Comprehensive procedure pursued and adhered to for the construction of tools is specified below.

3.3.4.1 Achievement Test

The researcher constructed achievement test with the intention to conduct pre-test and post-test as a part of experiment process. The achievement test constituted the questions covering the content of chapter 1 to chapter 6 of textbook- Social Science Contemporary India-I Text Book in Geography for Class IX prepared by NCERT, New Delhi published in the year 2006 reprinted in January 2010 with ISBN no. 81-7450-520-2, recommended by Central Board of Secondary Education for syllabus execution. The researcher outlined the blue print for the construction of the achievement test in Geography taking into consideration the type and level of questions. The blue print was of 100 marks with all objective type-multiple choice questions based on appropriate exposure of the content from all six chapters and with

coverage to knowledge, understanding and application levels questions. Adapting the generated blue print, the achievement test in Geography was constructed by the researcher. The constructed achievement test was shown to the ten experts (Teachers) in the field of Geography for the purpose of its validation. The suggestions of the experts were duly incorporated in the Geography achievement test. Determining the content validity of the Geography achievement test, the test was administered to 100, standard IX students of CBSE and the reliability of the achievement test was determined using split-half method. The reliability coefficient using split-half method was found to be 0.91 showing a high level of reliability. The Geography achievement test is given in appendix I.

3.3.4.2 Reaction Scale

A Likert type five point reaction scale was prepared by the researcher to study the reaction of the students of experimental group about the developed Multimedia Package for teaching Geography. 30 statements covering various aspects related to the construction, implementation, and experience from the multimedia package were framed and incorporated in the reaction scale. The five points of reaction were ranging from 'strongly agree' to 'strongly disagree' through 'agree', 'can't say', and 'disagree'. According to the student's reaction towards each statement, students were supposed to show their reaction by putting a tick mark (✓) in the appropriate box for each statement. All the statements framed were positive. For validation, the reaction scale was given to ten teacher educators having proficiency in educational tools for their suggestions and accordingly their suggestions were duly incorporated in the reaction scale. The reaction scale is given in Appendix III.

3.3.5 Development of Multimedia Package

The researcher developed multimedia package to teach the selected sample of experimental group in the subject of Geography for standard IX students of CBSE affiliated schools. In order to develop a multimedia package the researcher underwent the following different stages of its development.

- In-depth planning and the analysis of the content in collaboration with the associated team member in the development process of multimedia package.

- Drafting the script of the content to be presented in the package.
- Development of animation and video features.
- Assembling the features with audio text, graphics and animation and further editing for finalization.
- Validation of Multimedia Package
- Tryout-The pilot study.

3.3.5.1 Planning and Analysis of Content

The researcher resorted on the experts of software developers and sound system management consultancy in Surat city to get designed and developed a better multimedia package. A team of ten multimedia designers (animators) were involved in the project of developing the package. The researcher shared goal of creating the package and laid down the major objectives of the project with multimedia designers so that everyone working for the creation and development of package could carry a shared vision. The researcher, for the development of package took text book titled ‘Social Science Contemporary India-I Text Book in Geography’ for Class IX published by NCERT, New Delhi in the year 2006, reprinted in 2010 and recommended by Central Board of Secondary Education to be used as aid to teach the students of standard IX. All six chapters of Geography text book namely, India- Size and Location, Physical Features of India, Drainage, Climate, Natural Vegetation and Wild Life and Population were taken for the development of multimedia package. The researcher did scrupulous analysis of the text book content through content analysis, to acquire the content matter for the development of multimedia package and made the syllabus planning for the year on the basis of same. The draft of the syllabus plan along with the textbook was given to multimedia designers for them to go through its content for the initial phase and also for throughout the phase of development of package. Throughout the developmental phase there was continuous coordination between the researcher, and the technocrats.

3.3.5.2 Drafting Script and Voice Recording

On completion of initial planning and analysis of the content, the researcher drafted the script for the multimedia package by outlining the content. The text covered the main points of the content to be presented with the usage of language that appeals the

audience in jargon, tone and style. The text drafted for all six chapters was converted into voice recording to be incorporated in the package. The voice used for recording the content was that of the researcher. For voice recording, regular visits were made by the researcher to the recording centre. The researcher tried his best to give better tone and style to the speech and recording.

3.3.5.3 Development of Video Features (Story Boarding and Designing Phase)

Multimedia package is usually a collaborative output of varied aspects in the form of audio, video, imagery, text for voiceovers and on-screen titles which the team was supposed to bind everything together for each scene. For every scene the sketch of visual elements, the voiceover (title text) and the production notes were created. Further visual aspects were developed, graphics were created, navigations were designed, information design was created, and photographers were directed regarding the correct shots, photography and images to be collected. For information design and graphics design, the researcher browsed the topics on the internet and in the books, collected the necessary images and information to design the layout for multimedia package. The researcher also noted down, the narration and information to be included in Geographical vocabulary and technical design of the multimedia package. Accordingly the material was gathered as information for the topics, in the form of theory content, photographs, some of the static images that were free images downloaded from the internet. Along with this the process of creation of 2D animation video was carried on with the usage of Abode Flash (Monthly trial version packages).

3.3.5.4 Assembling the Features with Audio, Text, Graphics and Animation i.e. (Production)

The text material and media material that was collected from the books, internet were in their raw state, were assembled and assimilated in a multimedia package. The recorded voice was also merged in the multimedia package. The software used for development of multimedia package was Abode Flash. Graphics in the forms of 2D animation were merged in the presentation. Presentation incorporated detail explanation of each topic with an adequate amount of instances, illustrations and example. Explanation incorporated in itself examples related to each topic with theoretical and structural aspects. Adequate coverage of maps with proper labeling

was instilled in the package to have good idea about imaginary aspects of Geography. The images and pictures used in the developed package were associated to the real life situations. Researcher with the support of technical team tried to take care of the principles of developing multimedia package while building up the multimedia package. Researcher attempted to put pictures and words simultaneously wherever needed. He attempted by putting animation and narration together considering split attention effect. Researcher tried to present corresponding words and pictures near rather than far from each other on the page or screen. Researcher tried to avoid and exclude the usage of irrelevant extraneous material, sound, words in order to remove the negative effect of the same on learning by incorporating the use of proper words, sound and material in the package itself. The researcher tried to make best use of visual and auditory channels by explaining graphics with audio so that students improve learning. The build-up Multimedia Package was with enough scope for the teacher (here researcher himself) to be the facilitator and guide wherever an individual wants to get involved in the process of teaching. In order to evolve such multimedia package the researcher with the support of technical team edited it many a times especially after every chapter, taking into consideration the time constraints, story line and creative specifications. Each chapter was edited separately. In fact, this was more a complex stage and most time consuming. Where the large amount of editing was involved, longest time was consumed. The researcher gave his ample time and visits to the technicians to make modifications to bring best in the package. After rounds of scrutiny and reviews and final edits, the package was developed. The developed package was exposed to the experts in the field of education, technology as well as Geography. After obtaining reaction towards the developed multimedia package from Geography teachers (experts) of the schools of Surat, multimedia package was validated. The suggestions from these subject experts were duly incorporated by researcher on the way of construction of finally brought up multimedia package.

3.3.5.5 Validation of Multimedia Package

The development of Multimedia Package was shown to 20 experts. Ten of them were the teachers teaching Geography and ten were the software experts. All these experts were asked to give their feedback for the improvement of the developed package. On the basis of their feedback and suggestions the package was modified and made ready for tryout.

3.3.5.6 Tryout of the Multimedia Package

Pilot Study is a kind of user testing phase to ensure the multimedia package to have the desired impact. The pilot study of the package was done with the standard IX students of another English medium school affiliated to CBSE. The researcher observed students reaction, asked them few questions to see if the package hits the right marks and noted down the flaws and clues and on the basis of the reaction of the students, indispensable amendments were incorporated in the package. On getting satisfied, the package was made ready for its implementation by the researcher. The soft copy of multimedia package is provided with the thesis.

3.3.6 Procedure of Data Collection

Following phases were undertaken for the purpose of data collection.

3.3.6.1 Phase-1: Pre-Testing

In the beginning of the experimentation, the researcher administered the achievement test in Geography for the purpose of pretesting on both the experimental group and control group students. Both the control and experimental group students were informed about the testing two days before pretesting. Time duration of the test was one hour forty minutes (100 minutes), giving 1 minute to each multiple choice question. Both the groups were made equivalent on the basis of this pre-test score. In this process 30 student were segregated in each of control group and experimental group as samples for the purpose of experimentation.

3.3.6.2 Phase-II: Implementation of Multimedia Package

After taking the required permission from the authorities of the experimental school, Researcher being the Principal and the Geography teacher arranged a total of 60 periods in the timetable each with the duration of 35 minutes for the whole year of 2011-12 starting from June 2011 to February 2012 for the implementation of the multimedia package. The researcher himself taught all the six chapters of Geography to the whole experimental group for the arranged time period with the help of the developed multimedia package. Throughout the process of teaching-learning the researcher acted as a facilitator and guide. The researcher used discussion method while teaching Geography to the experimental group with the help of multimedia package. During this period of time, the researcher observed the students of the experimental group too. During the same duration the control group was taught Geography by their own teacher through traditional method. Few pictures are added here showing the researcher teaching the experimental group with the help of developed multimedia package.

Figure 3.1: The Researcher while Teaching Physical Features of India, the Great Northern Plains



Figure 3.2: The Researcher & Students while Viewing Physical Features of India



Figure 3.3: The Researcher while Teaching Latitudinal Extent of India

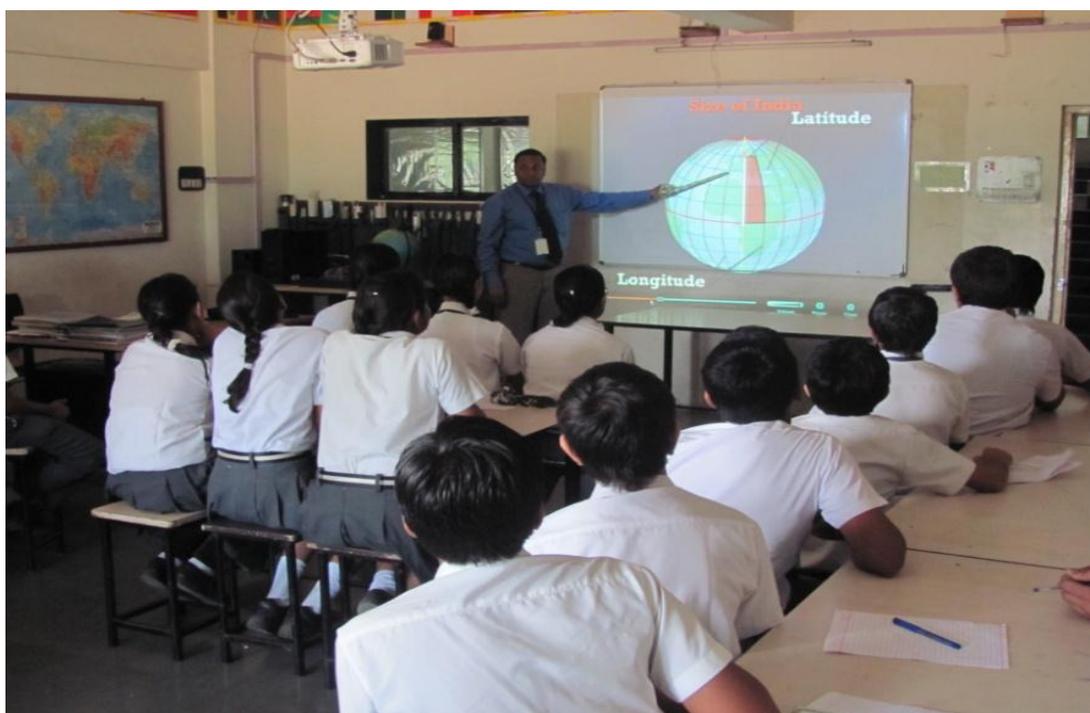


Figure 3.4: Self-Assessment by Students in Computer Lab



Figure 3.5: The Researcher while Writing Question on Board for Assessment of Learning among Students



Figure 3.6: The Researcher while Assessing Peer Group Activity



Figure 3.7: Student Engaged in Viewing the Images Features of Vegetation in India



3.3.6.3 Phase – III: Post-Testing

In the second week of February 2012 the researcher completed the teaching of Geography to the experimental group through multimedia package. During the same time the teaching of Geography to the control group was also completed by their teacher using traditional approach. During this time the developed achievement test in Geography used as the pre-test before, was administered again on both the whole control group and experimental group as the post-test by the investigator. The prepared reaction scale was administered on the experimental group students to know their reaction towards the developed multimedia package through which they were taught Geography for the whole year.

3.3.7 Procedure of Data Analysis

The collected data obtained through pre-test and post-test were analyzed by employing quantitative data analysis techniques. Pre-test achievement data related to Geography was used to make control and experimental group equivalent. Mean, Standard Deviation, Standard Error of Mean and Mann-Whitney U-test were used to analyze the quantitative data collected through post-test. The non-parametric Mann Whitney U-test was used to analyze the data as the sample was taken purposively as it is considered as the most powerful non parametric equivalent of t-test of parametric family. Data collected through reaction scale was analysed quantitatively with the help of percentage calculated for the frequency of responses and Intensity Index (II). The detailed analysis and interpretation of the data is given in chapter IV.

CHAPTER IV

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

| Caption no. | Particulars |
|--------------------|--|
| 4.0.0 | INTRODUCTION |
| 4.1.0 | ACHIEVEMENT IN GEOGRAPHY OF EXPERIMENTAL AND CONTROL GROUP |
| 4.2.0 | REACTION OF STUDENTS TOWARDS DEVELOPED MULTIMEDIA PACKAGE |
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CHAPTER IV

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.0.0 INTRODUCTION

Rational decision to a problem is the outcome of systematic analysis and interpretation of the data under study. This chapter deals with the analysis and interpretation of data collected through the tools viz. achievement test and reaction scale under the experiment conducted. Any unprocessed data to be substantial information has to undergo analysis, followed by its meaningful interpretation. The analyst can resort to different alternative analysis tools and techniques that are accessible for processing the data at its edge. Essential is the identification of suitable and appropriate analysis techniques by the analyst. Analysis assists in the build-up of the relationship between the data and subsequently aids to reduce the values to a solitary meaningful value that is comparable, understandable and further interpretable too. The undertaken experiment and its observations are condensed through analysis in a way that elucidates solution to the research problems. Interpretation further aims to investigate extensive meaning of these solutions. The central idea of analysis and interpretation is to assess and determine the extent of attainment of objectives of the laid task. Analysis of the research data also directs the researcher to either accept or reject a hypothesis underlying the research. The process makes conclusion and decision, the easy tasks for the researcher leading him on the road to formulation of a theory. Any research study cannot be completed barring this and the importance of data analysis and interpretation therefore cannot be undermined.

The present study is an experimental study with quasi experimental research design. The data were collected by the researcher by administering achievement test in two phases viz. pre-test & post-test on both control group and experimental group. The pre-test achievement score was used to make control group and experimental group equivalent. After making the group equivalent there were 30 students in both experimental and control group. Though the post testing was done on all the students of experimental and control group, only the data of both the equivalent groups with 30

students in each group were analysed to achieve the objectives of present study. As the nature of data was quantitative, the quantitative statistical techniques were adopted for analysis of data. The statistical techniques like Mean, Standard Deviation (SD), Standard Error of Mean (SE), Mann–Whitney U-test and Intensity Index (II) were used to attain different objectives of the present study.

Under mentioned formula was employed for deriving the Non–parametric statistics, Mann–Whitney U-test.

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - \sum R_1$$

Where,

n_1 = number in one group

$\sum R_1$ = sum of ranks in one group

n_2 = number in second group

To calculate and determine the z-value, the researcher used the following formula.

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

The selection of the sample was purposive and the assumptions of parametric statistics did not match for the present data, hence it became the cause for the researcher to favour the use of Mann–Whitney U-test. Exhaustive analysis of data is presented as follow.

4.1.0 ACHIEVEMENT OF EXPERIMENTAL AND CONTROL GROUPS IN GEOGRAPHY

To attain the objective 3 of the present study viz. “To study the effectiveness of the developed multimedia package in terms of achievement of students in Geography” and to test the null hypothesis that “There will be no significant difference in the

mean achievement score of Geography of control group students and experimental group students”, the analysis of data was done using statistical techniques viz. Mean, Standard Deviation and Mann-Whitney U-test. The detailed analysis is given in table 4.1 and table 4.2.

Table 4.1: Mean, Standard Deviation and Standard Error of Mean Wise Distribution of Achievement of Students of Experimental and Control Groups in Geography

| Achievement in Geography | N | Mean | Standard Deviation | Standard Error of Mean |
|--------------------------|----|-------|--------------------|------------------------|
| Experimental Group | 30 | 82.13 | 6.78 | 1.24 |
| Control Group | 30 | 70.33 | 6.34 | 1.16 |

From the table 4.1 it is found that the mean achievement of experimental and control group students in Geography were 82.13 and 70.33 respectively out of total score of 100. The standard deviation from the mean for the achievement in Geography were found to be 6.78 and 6.34 respectively for experimental group and control group students with standard error of mean of 1.24 and 1.16 for achievement in Geography for the experimental and control group respectively. Considering the mean achievement of both the experimental and control group, it can be said that both the groups did very good in Geography with more or less similar standard deviation and equally low level of standard error of mean. Further, comparing the mean achievement in Geography, it was found that the mean achievement of experimental group students in Geography was higher than that of the control group students. From the standard deviations and standard error of mean of both the groups it was also observed that in terms of homogeneity in the achievement, both the experimental group and control groups were found very equally homogeneous. The standard errors of mean for both the groups were found to be almost similar. The higher mean achievement score of experimental group in Geography in comparison to the control group may be due to the effect of the developed multimedia package. To find whether the difference in the mean was significant or by chance and to test the null hypothesis i.e. H_0 , “There will be no significant difference in the mean achievement score of Geography of control group and experimental group students”, Mann-Whitney U-test

was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.2, which is followed by analysis.

Table 4.2: Summary of Mann-Whitney U-test for Geography Achievement of Experimental and Control group students with the Number of Sample, Sum of Ranks, U-value, z-value and Probability

| Students | N | Sum of Ranks | U-value | z-value | Probability (p) |
|--------------------|----|--------------|---------|---------|-----------------|
| Experimental Group | 30 | 1275 | 90 | 5.322 | 0.00003 |
| Control Group | 30 | 555 | | | |

From table 4.2 it was observed that the sum of ranks of experimental group and control group students in Geography achievement were 1275 and 555 respectively with 30 students in each group. The U-value and z-value were found to be 90 and 5.32 respectively. Referring the table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_0) of z, for $z \leq 5.32$, the two tailed probability was found to be 0.00003 which was lesser than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. “There will be no significant difference in the mean achievement score of Geography of control group students and experimental group students,” was rejected and it could be believed that experimental group and control group students differ stochastically (significantly) in terms of their achievement in Geography. From table 4.1 it was also established that the mean achievement of experimental group when calculated from post achievement test in Geography was more than the mean achievement of control group in Geography that could be attributed to teaching Geography through the use of multimedia package. Hence it indicates that the developed multimedia package in teaching Geography was effective in enhancing student’s achievement in comparison to traditional approach. Thus it can be concluded that the developed multimedia package was found to be significantly effective in terms of enhancing students’ achievement in Geography in comparison to the traditional approach.

4.2.0 REACTION OF STUDENTS TOWARDS DEVELOPED MULTIMEDIA PACKAGE

Students of standard IX (experimental group in specific) were the ultimate recipient and the user of the developed multimedia package. Hence, it was very important to know the reaction of these students who were exposed to developed multimedia package. It would lead to find and determine the utility of the package for the students of standard IX in general. With this aspect in mind objective 4 of the present study i.e. “To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.” was set. To know the extent of realisation of the said objective the data was analyzed using percentage and Intensity Index (II), mentioned with its analysis in table 4.3. on the next page.

Table 4.3: Summary of the reaction of the students towards the statements related to the developed multimedia package in percentage and Intensity Index (II)

| Sr. No | Statements | SA % | A % | CS % | DA % | SDA % | II |
|--------|--|-------|-------|-------|-------|-------|------|
| 1. | I liked multimedia package through which I studied Geography. | 40.00 | 56.67 | 3.33 | 0.00 | 0.00 | 4.37 |
| 2. | Appropriate content coverage was done in multimedia for different chapters of Geography. | 26.67 | 43.33 | 13.33 | 16.67 | 0.00 | 3.80 |
| 3. | Content presented in multimedia package was organized properly. | 53.33 | 30.00 | 10.00 | 6.67 | 0.00 | 4.30 |
| 4. | The content presentation was interesting in multimedia package. | 43.33 | 43.33 | 6.67 | 3.33 | 3.33 | 4.20 |
| 5. | The language used in the multimedia package was easy to understand. | 36.67 | 36.67 | 20.00 | 3.33 | 3.33 | 4.00 |
| 6. | The introduction for each topic was appropriate in the multimedia package | 33.33 | 43.33 | 10.00 | 10.00 | 3.33 | 3.93 |
| 7. | The explanation given for each topic in the multimedia package lead to better understanding. | 40.00 | 43.33 | 13.33 | 3.33 | 0.00 | 4.20 |
| 8. | The different slides giving example on each topic and concept shown were appropriate. | 43.33 | 36.67 | 16.67 | 3.33 | 0.00 | 4.20 |
| 9. | The picture and the text presented for each topic and concept on a slide was appropriate. | 53.33 | 43.33 | 0.00 | 3.33 | 0.00 | 4.47 |
| 10. | Pictures in multimedia package were clear in learning different topics | 43.33 | 43.33 | 13.33 | 0.00 | 0.00 | 4.30 |
| 11. | The colored and animated pictures helped to develop interest in learning Geography. | 50.00 | 36.67 | 13.33 | 0.00 | 0.00 | 4.37 |
| 12. | The back ground colour used in the slides was pleasant. | 20.00 | 30.00 | 36.67 | 13.33 | 0.00 | 3.57 |
| 13. | The sound in multimedia package was clear and audible. | 20.00 | 43.33 | 23.33 | 10.00 | 3.33 | 3.67 |
| 14. | Proper representation of image, maps, diagrams, graphs, and tables were there in multimedia package. | 63.33 | 33.33 | 0.00 | 3.33 | 0.00 | 4.57 |
| 15. | Proper inclusion of animated maps, images and diagrams in multimedia package that were useful in representing phenomena over time. | 46.67 | 36.67 | 16.67 | 0.00 | 0.00 | 4.30 |

| Sr. No | Statements | SA % | A % | CS % | DA % | SDA % | II |
|--------|---|-------|-------|-------|-------|-------|-------------|
| 16. | Adequate or appropriate material was there in the developed multimedia package. | 33.33 | 36.67 | 16.67 | 13.33 | 0.00 | 3.90 |
| 17. | Time allotted to learn through multimedia package was sufficient. | 3.33 | 33.33 | 20.00 | 30.00 | 13.33 | 2.83 |
| 18. | Each abstract (imaginary) topic became easier while learning through multimedia package. | 46.67 | 40.00 | 10.00 | 0.00 | 3.33 | 4.27 |
| 19. | Combination of text, graphics and sound made our learning interesting for each topic. | 33.33 | 53.33 | 6.67 | 6.67 | 0.00 | 4.13 |
| 20. | The participation of students in the classes was more due to multimedia package. | 23.33 | 50.00 | 20.00 | 3.33 | 3.33 | 3.87 |
| 21. | Multimedia package helped to meet my needs as a learner. | 33.33 | 46.67 | 20.00 | 0.00 | 0.00 | 4.13 |
| 22. | We are able to apply the learnt knowledge in other situations due to learning through multimedia. | 26.67 | 36.67 | 33.33 | 3.33 | 0.00 | 3.87 |
| 23. | The multimedia package helped us to explore ourselves. | 36.67 | 40.00 | 16.67 | 6.67 | 0.00 | 4.07 |
| 24. | This multimedia package helped me to develop positive attitude towards learning Geography. | 46.67 | 30.00 | 16.67 | 6.67 | 0.00 | 4.17 |
| 25. | The multimedia package allowed me to be creative in my thinking | 46.67 | 33.33 | 13.33 | 6.67 | 0.00 | 4.20 |
| 26. | This multimedia package allowed me to think critically about the topics of Geography. | 23.33 | 46.67 | 30.00 | 0.00 | 0.00 | 3.93 |
| 27. | I felt very motivated learning Geography through multimedia package. | 20.00 | 60.00 | 16.67 | 3.33 | 0.00 | 3.97 |
| 28. | The multimedia package enhanced my overall understanding of the subject Geography. | 20.00 | 63.33 | 10.00 | 6.67 | 0.00 | 3.97 |
| 29. | I would like to learn other topics of Social Science also with this kind of package. | 76.67 | 16.67 | 6.67 | 0.00 | 0.00 | 4.70 |
| 30. | Teachers of other subjects should also use such multimedia package while teaching. | 73.33 | 10.00 | 16.67 | 0.00 | 0.00 | 4.57 |
| | Over all Reaction | | | | | | 4.09 |

In terms of the reaction of the students towards the statement 1 i.e. “I liked multimedia package through which I studied Geography.” 40.00 %, 56.67% and 3.33% of them reacted strongly agree, agree and can’t say respectively. The intensity index of 4.37 shows favourable reaction of students towards their liking for the developed multimedia package.

For the statement 2 i.e. “Appropriate content coverage was done in multimedia for different chapters of Geography.” 26.67%, 43.33%, 13.33%, and 16.67% of the students gave their reaction in strongly agree, agree, can’t say, disagree respectively. The intensity index of 3.80 shows favourable reaction of students towards the appropriate coverage of content done in multimedia developed for different chapters of Geography.

For statement 3 i.e. “Content presented in multimedia package was organized properly.” in the multimedia, 53.33 %, 30.00 %, 10.00 % and 6.67 % of the students gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 4.30 shows favourable reaction of students towards the proper organization of introduction of the content presented in multimedia package.

In terms of the reaction of the students towards the statement 4 i.e. “The content presentation was interesting in multimedia package.” 43.33%, 43.33%, 6.67%, 3.33% and 3.33% of them gave their reaction in strongly agree, agree, can’t say, disagree and strongly disagree respectively. The intensity index of 4.20 shows favourable reaction that stated the content presentation to be interesting in multimedia package.

For the statement 5 i.e. “The language used in the multimedia package was easy to understand.” 36.67%, 36.67%, 20.00%, 3.33% and 3.33% of the students gave their reaction in strongly agree, agree, can’t say, disagree and strongly disagree respectively. The intensity index of 4.00 shows favourable feedback on the part of students towards the language used for delivering content being found easy.

In terms of the reaction of the students towards the statement 6 i.e. “The introduction for each topic was appropriate in the multimedia package.” 33.33%, 43.33%, 10.00%, 10.00% and 3.33% of them gave their reaction in strongly agree, agree, can’t say,

disagree and strongly disagree respectively. The intensity index of 3.93 shows favourable reaction of students stating the appropriate introduction given for each topic in the package.

In terms of the reaction of the students towards the statement 7 i.e. “The explanation given for each topic in the multimedia package leads to better understanding.” 40.00%, 43.33%, 13.33% and 3.33% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 4.20 shows the favourable reaction of students towards the explanation given for each topic in the multimedia package lead to better understanding.

In terms of the reaction of the students towards the statement 8 i.e. “The different slides giving example on each topic and concept shown were appropriate.” 43.33%, 36.67%, 16.67%, and 3.33% of them gave their reaction in strongly agree, agree, can’t say, and disagree respectively. The intensity index of 4.20 shows the favourable reaction of students for the appropriateness of different slides giving example on each topic and concept presented through the developed multimedia package.

For the statement 9 i.e. “The picture and the text presented for each topic and concept on a slide was appropriate.” 53.33%, 43.33%, 3.33%, of the students gave their reaction in strongly agree, can’t say, and disagree respectively. The intensity index of 4.47 shows their favourable reaction towards the appropriateness of the picture and the text presentation for each topic and concept on a slide in the multimedia package.

In terms of the reaction of the students towards the statement 10 i.e. “Pictures in multimedia package were clear in learning different topics.” 43.33%, 43.33% and 13.33% of them gave their reaction in strongly agree, agree, and can’t say respectively. The intensity index of 4.30 shows their favourable reaction towards the clarity of pictures used in the multimedia package.

For the statement 11 i.e. “The colored and animated pictures helped to develop interest in learning Geography.” 50.00%, 36.67%, 13.33% of the students gave their reaction in strongly agree, agree, can’t say respectively. The intensity index of 4.37 shows the favourable reaction of the students towards the development of interest in

learning Geography through the colored and animated pictures incorporated in developed multimedia package.

For the statement 12 i.e. “The back ground colour used in the slides was pleasant.” 20.00%, 30.00%, 36.67%, 13.33% of the students gave their reaction in strongly agree, agree, can’t say, and disagree respectively. The intensity index of 3.57 shows the favourable reaction of the students on the usage of the back ground colour in the slides being pleasant.

In terms of the reaction of the students towards the statement 13 i.e. “The sound in multimedia package was clear and audible.” 20.00%, 43.33%, 23.33%, 10.00% and 3.33% of them gave their reaction in strongly agree, agree, can’t say, disagree and strongly disagree respectively. The intensity index of 3.67 shows the favourable reaction of the students towards the sound finding it to be clear and audible in multimedia package.

In terms of the reaction of the students towards the statement 14 i.e. “Proper representation of image, maps, diagrams, graphs, and tables were there in multimedia package.” 63.33%, 33.33%, and 3.33% of them gave their reaction in strongly agree, agree and disagree respectively. The intensity index of 4.57 shows that they gave favourable reaction to it and they found the proper representation of image, maps, diagrams, graphs, and tables in the multimedia package

In terms of the reaction of the students towards the statement 15 i.e. “Proper inclusion of animated maps, images and diagrams in multimedia package, that were useful in representing phenomena over time.” 46.67 %, 36.67%, 16.67% of them gave their reaction in strongly agree, agree, can’t say, respectively. The intensity index of 4.30 shows the favourable reaction of the students towards proper inclusion of animated maps, images and diagrams in multimedia package that were helpful and useful in representing phenomena over time.

In terms of the reaction of the students towards the statement 16 i.e. “Adequate or appropriate material was there in the developed multimedia package.” 33.33%, 36.67%, 16.67% and 13.33% of them gave their reaction in strongly agree, agree,

can't say and disagree respectively. The intensity index of 3.90 shows the student's favourable reaction towards the adequateness or appropriateness of the used material in the developed multimedia package.

In terms of the reaction of the students towards the statement 17 i.e. "Time allotted to learn through multimedia package was sufficient." 3.33%, 33.33%, 20.00%, 30.00% and 13.33% of the students gave their reaction in strongly agree, agree, can't say, disagree and strongly disagree respectively. The intensity index of 2.83 shows their undecided reaction for the above statement which shows that students found the time allotted to learn through multimedia package was neither sufficient nor insufficient.

For the statement 18 i.e. "Each abstract (imaginary) topic became easier while learning through multimedia package." 46.67%, 40.00%, 10.00%, and 3.33% of the students gave their reaction in strongly agree, agree, can't say, and strongly disagree respectively. The intensity index of 4.27 shows the favourable reaction of students for the statement which shows that through the usage of this kind of multimedia package abstract (imaginary) topic can become easy to learn.

In terms of the reaction of the students towards the statement 19 i.e. "Combination of text, graphics and sound made our learning interesting for each topic." 33.33%, 53.33%, 6.67%, and 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.13 shows their favourable reaction for the statement. It shows that the kind of combination of text, graphics and sound in developed multimedia package made students learning interesting for each topic.

In terms of the reaction of the students towards the statement 20 i.e. "The participation of students in the classes was more due to multimedia package." 3.33%, 50.00%, 20.00%, 3.33% and 3.33% of them gave their reaction in strongly agree, agree can't say, disagree and strongly disagree respectively. The intensity index of 3.87 shows their favourable reaction for the statement which shows that this kind of multimedia package results in more participation of students in the classes.

For the statement 21 i.e. “Multimedia package helped to meet my needs as a learner.” 33.33%, 46.67%, 20.00%, of the students gave their reaction in strongly agree, agree, and can’t say respectively. The Intensity Index of 4.13 shows their favourable reaction for the statement which shows that this kind of multimedia package helps to meet the needs of a learner.

For the Statement 22 i.e. “We are able to apply the learnt knowledge in other situations due to learning through multimedia.” 26.67%, 36.67%, 33.33%, 33.33% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 3.87 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to apply the learnt knowledge in other situations. Students are able to make use of the learnt knowledge in life like situation. It shows the application aspect of this package and higher level of learning developed on usage of this kind of multimedia package

For the Statement 23 i.e. “The multimedia package helped us to explore ourselves.” 36.67%, 40.00%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 4.07 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful in self-exploration.

For the Statement 24 i.e. “This multimedia package helped me to develop positive attitude towards learning Geography.” 46.67%, 30.00%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 4.17 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to develop positive attitude towards learning Geography.

For the Statement 25 i.e. “The multimedia package allowed me to be creative in my thinking.” 46.67%, 33.33%, 13.33%, 6.67% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 4.20 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to a child to be creative in thinking.

For the Statement 26 i.e. “This multimedia package allowed me to think critically about the topics of Geography.” 23.33%, 46.67%, 30.00%, of them gave their reaction in strongly agree, agree and can’t say respectively. The intensity index of 3.93 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to children, think critically.

For the Statement 27 i.e. “I felt very motivated learning Geography through multimedia package.” 20.00%, 60.00%, 16.67%, and 3.33% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 3.97 shows their favourable reaction for the statement which shows that this kind of multimedia package can motivate the child learning Geography.

For the Statement 28 i.e. “The multimedia package enhanced my overall understanding of the subject Geography.” 20.00%, 63.33%, 10.00%, and 6.67% of them gave their reaction in strongly agree, agree, can’t say and disagree respectively. The intensity index of 3.97 shows their favourable reaction for the statement which shows enhancement of overall understanding of the subject Geography through the use of multimedia package.

For the Statement 29 i.e. “I would like to learn other topics of Social Science also with this kind of package.” 76.67%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree and can’t say respectively. The intensity index of 4.70 shows their favourable reaction for the statement. Majority would like to learn other topics of Social Science also with this kind of package. Students expect other subject teachers to make use of this kind of multimedia package for teaching other subjects.

For the Statement 30 i.e. “Teachers of other subjects should also use such multimedia package while teaching.” 73.33%, 10.00%, 16.67% of them gave their reaction in strongly agree, agree and can’t say respectively. The intensity index of 4.57 shows their favourable reaction for the statement propounding the usage of the kind of multimedia package for other subjects.

In terms of the overall reaction of the students towards the multimedia package the average intensity index was found to be 4.09 which indicate the overall favourable reaction of the students towards the multimedia package that was used for their Geography learning. Out of 30 statements revealed to the students in the reaction scale that describes different aspects of the developed multimedia package, students have shown highly favourable reaction for three statements, favourable reaction for twenty six statements and neutral reaction towards one statement. Correspondingly, the overall reaction of the students towards the developed multimedia package was found to be favorable. Hence it could be concluded that students have favourable reaction towards the multimedia package through which they learned the Geography. Consequently it can be perceived that the multimedia package to teach Geography was found to be effective in terms of the reaction of students.

4.3.0 MAJOR FINDINGS OF THE STUDY

Following major findings were drawn for the present study on the basis of the analysis and interpretation of the data.

1. The developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach.
2. The developed multimedia package to teach Geography was also found to be effective in terms of the reaction of students towards the package.

Apart from the said major findings, followings are few observations that strengthen the acceptability of students to learn through multimedia package.

- Students were quite active in learning through multimedia package.
- Students were eager to know about the next fact while learning through the multimedia package.
- Students were found helping each other in solving problems while learning through multimedia package.
- Students were found happy while working in the groups during the teaching through multimedia.

- Students were found quite interested in the pictures for understanding various phenomenon.
- Students were found interested to see the multimedia package repeatedly.
- Students demanded the copy of multimedia package to be installed in Geography Laboratory of the school for their further reference.
- The students were found very quickly completing the exercise given in the text book while learning through multimedia package.
- The students were found interested in knowing the technical aspects of the multimedia package like how it was developed, how the maps were prepared, which package was used to develop this, etc.

4.4.0 DISCUSSION

Impact and influence of technology in most of the fields of the society cannot be undermined and education is wrapped within it. People in the areas of education have become conscious to integrate technology, exploit its usefulness and avail the benefits of same. Integration of computers and computer allied activities in education and in specific in the classrooms have transformed the present day's classrooms scenario. Computer is little less to replace the human teacher an unbeatable fact, but sure it can assist both teachers and students to an enormous level and bring them in a comfort zone. So it has evolved and emerged as a present trend to use the multimedia for teaching different subjects in the area of computer application in the classrooms. Multimedia when developed with appropriate infusion of technology, following the principles of multimedia and learning and when incorporated in the class with proper facilities can make the class dynamic, energetic, joyful and further can articulate the process of enhancing achievement. The present study was an effort in this direction that focused to teach Geography through multimedia package.

The major findings of the present study states that the developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach and the developed multimedia package to teach Geography was also found to be effective in terms of the reaction of students towards the package.

Findings of the study conducted by Hickey and Bein (1996) supports the findings of the present study that states visualizing physical aspects of Geography through multimedia can enhance the learning experiences of the students. Study conducted by Gabrielle (2003) too supports the findings of the present study and shows that systematically designed technology-mediated instructional strategies can positively affect performance and learning of the students. Study conducted by Floyed (2006) also shows the findings in line with the present study as it shows that the use of technology has positive effect on student's achievement as it increases student's achievements. Findings of the study conducted by Rosales (2005) supports the findings of the present study and shows that technology has positive effect on student's achievement. Besides the above studies which support the findings of the current study, there are studies that contradict the findings of the present study the study conducted by Proctor and Richardson (1997) that focused on evaluating the effectiveness of multimedia computer modules on introductory Human Geography stated that quantitative evaluation of effectiveness of multimedia in itself is ineffective. Charsky (2004) study aimed to check the effectiveness of Programmed Auto Learning vis-à-vis other methods, stated other methods to be more effective than the programmed learning. Reason that could be associated is to the type of programmed learning materials developed in the past. The nature of learning materials developed in the existing days in the form of multimedia packages incorporates much more advanced aspects and features and so is the developed multimedia package used in the present study that takes care of extending more sensory activities to the students with advanced forms of animation and simulation. Findings of the study conducted by Spradlin (2010) supports the fact that mere presence of computers does not improves students learning and that quality is essential in any mode of instruction. The comparative better result in the Geography achievement of experimental group in the present study shows the quality of both the multimedia package and the way it was implemented.

The findings of the present study show that the developed multimedia package was more effective than the traditional method of teaching in terms of achievement of students in Geography. Reasons can be associated to some of the common known facts that the teaching through traditional method adopted in a classroom teaching

does makes the student more a passive learner and does not take care of inclusion of more sensory activities of the students in comparison to that of multimedia package. The students are compelled to be the recipients of whatever the teacher teaches to them in the class, notwithstanding their interest as against the developed multimedia package that has images and structures representations that can be associated to life like situations. Moreover, the student's experiences, imagination strength and understanding level might have assisted in relating the learnt things with diverse situation. Multimedia package allowed the students to be recipient of the information of their interest and at their pace that might have assisted in better learning. Thus the overall effect of multimedia package in comparison to traditional method was found to be more effective.

As far as the reactions of the students were concerned they were too found favourable towards the multimedia package. Change is the spice of life and so one of the reasons behind favourable reaction may be the change adopted in teaching – learning process itself, and the additive reasons may be the incorporation of color mix in the images and structures, animation effects to pictures, the background of the slides, the clarity of explanation, the relevance and importance of the exposed images and content through multimedia package in their lives, utility of the learnt topics in life, freedom of learning through the multimedia package. The researcher opines that the students of this level like the animation, pictures which might have developed their liking for the developed multimedia package.

4.5.0 SUGGESTIONS FOR THE FURTHER RESEARCH

In view of the fact that the present study was limited to the chapters of Social Science Contemporary India-I Text Book in Geography for class IX prepared by NCERT, New Delhi prescribed by Central Board of Secondary Education and to the students of P.P. Savani Chaitanya Vidya Sankul, Surat and to the development of multimedia package for teaching-learning Geography, the researcher would like to suggest some more areas and issues for the further research.

- Similar studies could be conducted taking the sample randomly for more generalisation.

- Experiment on similar multimedia packages could be done in other standards with different boards of affiliation.
- An advanced multimedia package incorporating more of 3D and digital aspect, and an interactive one can be developed for teaching same or alike topics of Geography for future research.
- Such multimedia packages can be developed for the whole Social Science and be experimented.
- Longitudinal studies could be conducted to see the effectiveness of multimedia package over a longer period of time in different subjects.

CHAPTER V

SUMMARY

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CHAPTER V

SUMMARY

5.0.0 INTRODUCTION

Social Studies / Social Science is a discipline that is very vast and in fact as wide as the world itself and as lengthy as the history of man on this earth. Michaels (n.d.) specified “The breadth of Social Studies programme should provide for a variety of experiences so that the child’s learning will be well-rounded and well balanced. It should also be possible to draw upon other fields of learning so that significant problems can be considered in the light of their ramification; a narrow compartmentalized programme limits social learning”. The importance of Social Science has been felt worldwide for the purpose of social reconstruction and development of the mankind. One of the subjects taught in Social Science is Geography which helps the children to understand their own earth, its characteristics and the interdependence of earth with the society. Geography has huge importance in the teaching of Social Studies. Geography occupies a unique position in the school curriculum, standing as it does transitionally yet centrally between the Natural Sciences, the Social Sciences and the Humanities. Geographic knowledge is demanded for existence and progress in today’s modern world that retrospect faster change with the utilization of the environmental resources in exhaustible manner, thereby affecting the natural balance on the earth. Individuals are expected to be sensitive and react wisely to the number of changes taking place in the physical and natural aspects on the earth. Improving geographical knowledge and skills is important to our nation and its future. Hence the proper transaction of the knowledge of Geography is important for all students.

In the technology driven society, textbooks are still seen as an integral part of most education systems and serves as bridges between teachers and students. Our process to teach Geography is general routine, teacher centered and authoritative stressing upon rote learning. The learners accumulate a substantial amount of non-functional and unrelated

facts which are promptly forgotten as it becomes very difficult for the children to link the provided knowledge to their life. Thereby making it ineffectual and boring for the students.

In the present world of hyper-technology, where change leads the life, there is desired need to bring drastic changes in the way the knowledge of Geography is imparted to the children. Children have to be exposed to new approaches and methodology to transfer to a great extent the abstract knowledge of Geography for them to understand the Geography of the earth on which they live and to develop interest and attitude.

In order to improve the effectiveness of teaching in Geography, application of computer based multimedia technology is inevitable to get best results as no longer teaching Geography is learning-by-heart countries, capitals and crops. To help the children to grasp the human aspect of the relationship between man and his home, the earth, the moving pictures are of greater value than the still, though both have their place. The excitement inherent in the movement acts as a stimulus to imagination and hence helps to extend experience. Geography provides a rich and varied context for the use of new technologies to enhance both learning in the subject and to reinforce existing ICT skills. It can help pupils investigate, organize, edit and present geographical information in many different ways and so ICT have important role to play in Geography.

The CD-ROMs can be prepared by subject experts and multimedia professionals, to fill in this vital need. The textbook can be accompanied with the CD-ROM that can be written in simple language and well designed to facilitate the learning process. Readily available CD may not suffice the purpose of teaching learning. Tailor made packages according to the need of syllabus can prove to be more worthy. Though Indian Schools have started the involvement of such packages in schools but are insufficient according to the requirement. There is scope for teachers to initiate the development of such multimedia packages.

Considering these scope of technology particularly, multimedia technology in the field of teaching Geography, the researcher took the help of multimedia technology in preparing a package to teach Geography to standard IX CBSE affiliated school students and further made an attempt to assess and measure its efficacy.

5.1.0 RATIONALE OF THE STUDY

Social Studies, is the study of society and its aim is to help pupils to understand world in which they have to live and how it came to be, so that they may become responsible citizens. It aims at promoting critical thinking and a readiness for social change, at creating a disposition for acting on behalf of the general welfare, at an appreciation of other cultures and a realization of the inter-dependence of man and nation. The subject of the Social Studies which deals directly with man and the society in which he lives, carries special responsibility of preparing young children to become well informed, constructive participants in society and capable of developing healthy social relationships. Social Studies helps students to develop social relationship, social efficiency, objective attitude, citizenship training, constructive and critical thinking, integrated knowledge, intelligent understanding, adaptability, appreciation of other's view point, learning, sensitiveness to social issues, tolerance, unbiased attitude, devotion to ideas, inter-relationships, emotional balance, self-discipline, social attitude among students. The development of these values and attributes among students can lead the civilization to prosperity, particularly, at this time of crisis and problems worldwide.

Geography, a part of Social Studies, is a science concerned with the study and description of the earth. It is the study of the relationship between the man and the earth on which he lives. Geographic knowledge is increasingly important for survival and progress in today's world. Especially in the modern world where the growth is taking at a faster pace making use of the environmental resources, those environmental resources which are non-renewable in nature thereby affecting the natural balance on the earth. As a result of this number of changes are taking place in the physical and natural aspects on the earth about which an individual should be made aware of. Moreover, it is also observed that

most of teachers of Geography mostly use the lecture method in teaching Geography. Audio-visual teaching and learning aids, including maps, were not considered necessary and were not used in classes. Field trips and excursions are found limited usage in both urban and rural schools. This has made the subject of Geography boring for the students in terms of both teaching and learning making the subject un-interesting and hence decreasing the motivation level of students towards learning of these subjects. There is a vast gap in the way the knowledge of Geography is imparted to the children and in the way it should be imparted looking into the demand of today's world of technology so that the children develop interest and attitude in gaining the knowledge of Geography and understand the Geography of the earth on which they live. All these factors accumulated to create an adverse attitude towards the learning of this subject. With the deepening of the curriculum reform, teachers teaching the original concepts and teaching methods, has been far behind the times. New teaching model is clear to us to actively explore the modern teaching methods. In the present world of technology, where growth is accelerating at a faster pace, need has felt to bring drastic changes in the way the knowledge of Geography is imparted to the children. The present study is an attempt in this direction to experiment an interesting mode of technology to improve the teaching learning process of Geography among students using multimedia technology.

Education has always acknowledged versatility and efficiency of multi-media communications. Mixing face-to-face teaching, self-learning, use of audio-visual aids and do-it-yourself activities has been part of this understanding. Multimedia is a rapidly evolving technology that is bridging the gap between reality and magic. Multimedia has revolutionized every aspect of life around us and is fast gaining acceptance in the shape of careers. Multimedia is a natural extension of a creative mind. It helps you harness the potential of ideas. Multimedia package can be presented as an interactive, ready-reference and learner-centered multimedia tool and cater to all levels of education. These user-friendly packages can be developed that will include a wide variety of animation, graphics and video clippings, etc. Multimedia teaching methods are in a unique advantage into the schools, into the classroom, with its distinctive teaching

characteristics, so that the classroom is more colorful. Multimedia instruction uses motion, voice and music, text, graphics, video and still images, to enhance learning by stimulating multiple sensory organs simultaneously. When combined, these tools enable the elegant explanation and enhanced comprehension of learning objects. Studies focused on the effectiveness of multimedia education have proven that multi-media learning resources are often more effective than text-only resources, particularly when the learner is introduced to completely new material. When utilised properly in conjunction with text-based information, images have been proven to enhance motivation, attention, comprehension and recall. Studies have concurred that people retain only 20 percentage of what they see but they remember as much as 80 percentage of what they see, hear, and do simultaneously. Multimedia technologies offer high-tech support for a range of visual, textual and aural sources, which complement the Accelerated Learning method. Using a variety of media to present information caters for more learning styles. Multimedia technology can maximise the potential of the learner's intelligences and improve their quality of learning, e.g. hands-on interactivity enhances the kinesthetic intelligence; logical/ mathematical intelligences can be maximized through problem-solving. No matter what one's intelligence, multimedia presentations trigger visualization strategies such as mental imagery, which is crucial to many kinds of problem solving and retention.

The review of related studies reveals no studies were found by the researcher in India related to the development of multimedia packages in teaching of Geography at secondary level except one study done by Idayavani (1991) developing video programme in Physical Geography for higher secondary students. The researcher has come across only this study which would help to understand the area of teaching Geography through Multimedia Packages developed with the use of computer technology and other media. A very useful handbook for teachers of Geography, edited by D. Forsaith, states that one function of school Geography is to 'help the child to adjust itself to...the world as a whole through enlightened pictures of other peoples and races, leading to a sound and just international sentiment'. This can be done by the means of presentation of enlightened pictures, descriptions, maps, accounts of adventure and travel, as well as films, postcard,

drawings, photographs, etc. The nature of the content of Geography demands a series of well-planned expeditions, leading to projects as they become abstract in nature when explained verbally. But if more of field trips and excursions are planned, then it becomes more time consuming. Here, multimedia packages developed with the integration of different media such as text, sound, video, images, two dimensional (2D) and three dimensional (3D) graphics and animation; coupled with the power of interactive digital technology to offer information with impact, can be effectively used for those topics especially which requires more of imaginations or field visits. It bears the capacity to make abstract world be felt real to the students. In Geography teaching, usage of multimedia technology can create teaching situation, students from the multi-faceted sensory stimulation system can be catered with, can help to stimulate students interest in learning, cultivate noble character, create a good moral character, increase classroom capacity, the development of intelligent students to develop their comprehensive ability, can contribute to improve the vitality of Geography teaching, and promote overall development of students in an effective way.

Standard IX is the crucial standard of secondary education which is needed to be sound for secondary examination at standard X and that to lead a discipline and career in higher/senior secondary stage. Being a practitioner teacher of Geography in Central Board of Secondary Education for the last fifteen years, the researcher felt the need for using technology in teaching-learning of Geography so as to take care of the limitation of Human Teacher in the same.

The proposed study was an attempt in this direction to develop a multimedia package on Geography to teach standard IX CBSE students considering these research questions in mind.

5.2.0 RESEARCH QUESTIONS

In the process of formulating the present research study, the following research questions came in the mind of the researcher.

- Whether multimedia in computer can be used for effective teaching of Geography?
- Whether students studying Geography through multimedia do better in comparison to the students studying the same through traditional method?

5.3.0 STATEMENT OF THE PROBLEM

DEVELOPMENT AND IMPLEMENTATION OF MULTIMEDIA PACKAGE TO TEACH GEOGRAPHY TO STANDARD IX CBSE STUDENTS

5.4.0 OBJECTIVES OF THE STUDY

The present study was designed with the following objectives.

1. To develop a multimedia package in subject of Geography for standard IX CBSE students.
2. To implement the developed multimedia package for teaching Geography to standard IX CBSE students.
3. To study the effectiveness of multimedia package in the terms of achievement of students.
4. To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.

5.5.0 HYPOTHESIS

The following hypothesis was formed which was tested at 0.01 level of significance.

There will be no significant difference in the mean achievement score of Geography of control group and experimental group students.

5.6.0 DEFINITION OF TERMS

Following term was defined in the present study by the researcher pertaining to the present study.

Multimedia Package: For the present study the multimedia package was defined as a computer based package that includes the integration of different media such as, text, sound, video, images of two dimensional forms, simulations and animations to offer information with impact.

5.7.0 OPERATIONAL DEFINITION OF TERMS

Following terms were operationally defined in the present study.

Achievement in Geography: Achievement in Geography was the marks obtained by the students of standard IX in the subject of Geography in the achievement test constructed by the investigator.

Reactions of Students: The scale value of the preferred belief of the students regarding the component of the developed multimedia package on a five point-scale was considered as the reaction of the students towards the component of the multimedia package. The aggregate qualitative scale value was considered as the overall reaction towards the developed multimedia package.

5.8.0 DELIMITATION OF THE STUDY

The present study the Geography curriculum for standard IX students was delimited to all the six units of standard IX (Social Science) Geography textbook titled ‘Social Science Contemporary India-I Textbook in Geography for Class IX’ prepared and published by NCERT, New Delhi in March 2006, reprinted in January 2010 and which was prescribed by Central Board of Secondary Education for the execution of syllabus in CBSE affiliated schools. These units were (i) India–Size and Location (ii) Physical Features of

India (iii) Drainage (iv) Climate (v) Natural Vegetation and Wild Life and (vi) Population.

5.9.0 METHODOLOGY

The present study was experimental in its nature. As the sample for the present study was selected purposively, quasi-experimental research design was adopted. Pre-test post-test nonequivalent group design was followed.

5.9.1 Population of the Study

All the standard IX students studying in CBSE affiliated English medium schools of Gujarat in the year 2011-12 constituted as the population for the present study. There were a total of 232 CBSE affiliated secondary schools and 14665 standard IX students in those schools affiliated to CBSE in Gujarat for the year 2011-12. (Derived data as per students enrollment done in standard IX in Gujarat for the X AISSE Board examination that was to be conducted by CBSE for year 2012-13.)

5.9.2 Sample of the Study

Considering the experimental nature of present study and feasibility aspect of experimentation, data collection and easy availability all required facilities and the researcher's convenience the sample were selected purposively. Two CBSE affiliated secondary schools of Surat city were taken purposively as the sample school for the present study namely P.P. Savani Chaitanya Vidya Sankul, Abrama, Surat as the school (with section A of standard IX as the sample group) for experimental group and Radiant English Academy, Piplod, Surat as the school (with section A of standard IX as the sample group) for controlled group. There were 35 and 37 students in the sample of experimental and control groups respectively. On the basis of pre-test achievement score in Geography, the groups were made equivalent with a sample of 30 students of standard IX CBSE affiliated schools in each of control group and experimental group.

5.9.3 Tools for Data Collection

In the process of attainment of the objectives for the present study, an Achievement test in Geography and a Reaction scale were constructed by the researcher.

Achievement test was based on the content of 'Social Science Contemporary India-I Textbook in Geography for Class IX published by NCERT, New Delhi in March 2006. Achievement test was of 100 marks with due coverage of the content and covering knowledge, understanding and application based objective type, multiple choice question and was duly tested for its validity and reliability. The content validity of the achievement test was found out by incorporating the suggestions of ten experts in the area of Geography teaching. The reliability coefficient using split-half method was found to be 0.91 showing a high level of reliability.

A Likert type five point reaction scale ranging from 'strongly agree' to 'strongly disagree' through 'agree', 'can't say', and 'disagree', was prepared to study the reaction of the students of experimental group about the developed multimedia package for teaching Geography. 30 positive statements related to the construction, implementation, and experience from the multimedia package were framed and incorporated in the reaction scale. Students were supposed to show their reaction by putting a tick mark (✓) in the appropriate box for each statement. The reaction scale was also validated. The content validity of the reaction scale was found out by incorporating the suggestions of ten experts in the area of measurement.

5.9.4 Development of Multimedia Package

In order to develop a multimedia package the researcher underwent following stages of its development.

- In-depth planning and the analysis of the content in collaboration with the associated team member in the development process of multimedia package.
- Drafting the script of the content to be presented in the package.

- Development of animation and video features.
- Assembling the features with audio text, graphics and animation and further editing for finalization.
- Validation of Multimedia Package.
- Tryout of the Multimedia Package.

5.9.5 Procedure of Data Collection

Data was collected in three phases as given below.

Phase-1: Pre-Testing

In the beginning of the experimentation, the researcher administered the achievement test in Geography for the purpose of pretesting on both the experimental group and control group students. Both the control and experimental group students were informed about the testing two days before pretesting. Time duration of the test was one hour forty minutes (100 minutes), giving 1 minute to each multiple choice questions. Both the groups were made equivalent on the basis of this pre-test score. In this process 30 student were segregated in each of control group and experimental group as samples for the purpose of experimentation.

Phase-II: Implementation of Multimedia Package

After taking the required permission from the authorities of the experimental school, Researcher being the Principal and the Geography teacher arranged a total of 60 periods in the timetable each with the duration of 35 minutes for the whole year of 2011-12 for the implementation of the multimedia package. The researcher himself taught all the six chapters of Geography to the whole experimental group for the arranged time period with the help of the developed multimedia package. Throughout the process of teaching-learning the researcher acted as a facilitator and guide. The researcher used discussion method while teaching Geography to the experimental group with the help of multimedia package. During this period of time, the researcher observed the students of the

experimental group too. During the same duration the control group was taught Geography by their own teacher through traditional method.

Phase – III: Post-Testing

In the second week of February 2012 the researcher completed the teaching of Geography to the experimental group through multimedia package. During the same time the teaching of Geography to the control group was also completed by their teacher using traditional approach. During this time the developed achievement test in Geography used as the pre-test before, was administered again on both the whole control group and experimental group as the post-test by the investigator. The prepared reaction scale was administered on the experimental group students to know their reaction towards the developed multimedia package through which they were taught Geography for the whole year.

5.9.6 Procedure of Data Analysis

The collected data obtained through pre-test and post-test were analyzed by employing quantitative data analysis techniques. Pre-test achievement data related to Geography was used to make control and experimental group equivalent. Mean, Standard Deviation, Standard Error of Mean and Mann-Whitney U-test were used to analyze the quantitative data collected through post-test. The non-parametric Mann Whitney U-test was used to analyze the data as the sample was taken purposively as it is considered as the most powerful non parametric equivalent of t-test of parametric family. Data collected through reaction scale was analysed quantitatively with the help of percentage calculated for the frequency of responses and Intensity Index (II).

5.10.0 MAJOR FINDINGS OF THE STUDY

Following major findings were drawn for the present study on the basis of quantitative analysis and interpretation of the data.

1. The developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach.
2. The developed multimedia package to teach Geography was also found to be effective in terms of the reaction of students towards the package.

5.11.0 SUGGESTIONS FOR THE FURTHER RESEARCH

In view of the fact that the present study was limited to the chapters of Social Science Contemporary India-I Text Book in Geography for class IX prepared by NCERT, New Delhi prescribed by Central Board of Secondary Education and to the students of P.P. Savani Chaitanya Vidya Sankul, Surat and to the development of multimedia package for teaching-learning Geography, the researcher would like to suggest some more areas and issues for the further research.

- Similar studies could be conducted taking the sample randomly for more generalisation.
- Experiment on similar multimedia packages could be done in other standards with different boards of affiliation.
- An advanced multimedia package incorporating more of 3D and digital aspect, and an interactive one can be developed for teaching same or alike topics of Geography for future research.
- Such multimedia packages can be developed for the whole Social Science and be experimented.
- Longitudinal studies could be conducted to see the effectiveness of multimedia package over a longer period of time in different subjects.

5.12.0 CONCLUSION

The objective of this study was to find the effectiveness of multimedia in teaching Geography to the students of standard IX affiliated to CBSE. The finding of the present research supports multimedia as an effective instructional tool. Results showed that both the control group and experimental group of students did very good as far as achievement is concerned, but the achievement of the group taught through the multimedia was found better than the students who were taught through traditional method. It shows that multimedia helps in improving the learning in Geography. There are other studies (Hickey and Bein, 1996; Gabrielle, 2003; and Rosales, 2005) which supports that multimedia learning resources are often more effective than other traditional resources. It indicates that using multimedia in teaching could help students to learn the content in a better way as these technologies offer varied of learning support in the form of motion, voice and music, text, graphics, video and still images that stimulates multiple sensory organs simultaneously. This impact of multimedia was also observed by the researcher during experimentation, where students were quite active, eager to know about the next facts, helping each other while solving problems, quite interested in the graphics for understanding various phenomenon, and interested to know the technical aspects of the multimedia package like how it was developed. The reaction of the students toward the multimedia package and its usage were quite positive. These findings proved the age old proverb “Tell me and I forget, Show me and I remember, Involve me and I understand”.

The results of this study have direct implications on the future methodology of Geography teaching at secondary level and an indirect implication for other subjects and levels. It emphasizes on the usage of multimedia as an alternative instructional tool to the traditional classroom for the subject of Geography learning that is quite abstract. It could be used as an instructional system in formal educational situation. The comparative better result in the Geography achievement of experimental group in the present study shows the quality of both the multimedia package and the way it was implemented. Therefore, the study also has implications for teachers to have better planning for the teaching - learning process. Findings of the study conducted by Spradlin (2010) supports

the fact that mere presence of computers does not improve students learning and that quality is essential in any mode of instruction. 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). It talks about strengthening the teachers in the area of computers and the usage of the same in teaching-learning. The review of related literatures shows the lack of teachers' engagement in such kind of multimedia projects. Time has come to break the walls of traditional approach to teaching-learning and coming ahead with some innovative strategies. A teacher made multimedia package extending more sensory activities to the students with advanced forms of animation and simulation can be used effectively for providing information and content knowledge to school students. More and more educators need to be involved in the production of multimedia packages considering the end-users needs. Here, the researcher recommends the regular organization of the training programmes, seminars and workshop for the teachers providing an effective form of training, for using multimedia technology in education and to help them learn the creation of such multimedia packages and further get motivated to involve themselves in its development so as to make their teaching - learning more exciting and effective. Both private sector and public sector organizations need to initiate measures in the activities to empower our classrooms and teachers to face the challenges of the education system of Generation Next.

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APPENDIX : I**ACHIEVEMENT TEST IN GEOGRAPHY**

Date : _____ **Max. Marks: 100**

Std. : IX **Time : 1 hr 40 min.**

NAME :

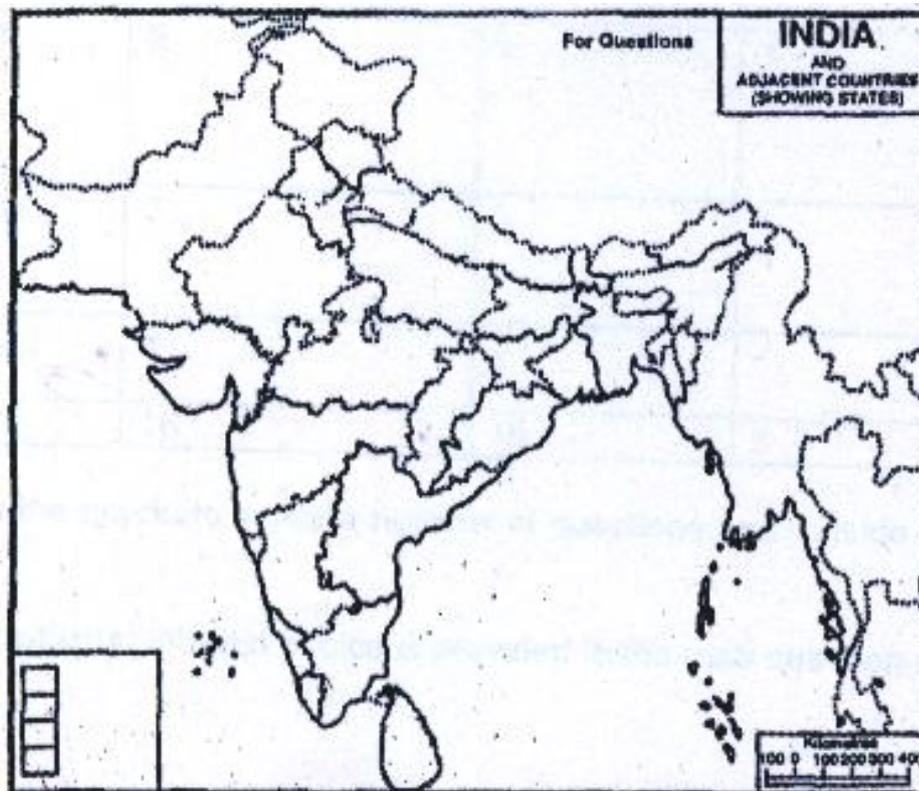
ROLL NO. :

Choose (Circle) the right answer from the four alternatives given below.

1. The tropic of Cancer does not pass through
a) Rajasthan b) Orissa c) Chhattisgarh d) Tripura
2. The easternmost longitude of India is
a) $97^{\circ} 25' E$ b) $77^{\circ} 6' E$ c) $68^{\circ} 7' E$ d) $82^{\circ} 32' E$
3. Uttaranchal, Uttar Pradesh, Bihar, West Bengal and Sikkim have common frontiers with
a) China b) Bhutan c) Nepal d) Myanmar
4. If you intend to visit Kavaratti during your summer vacations, which one of the following Union Territories of India you will be going to
a) Pondicherry c) Andaman and Nicobar
b) Lakshadweep d) Diu and Daman

25. Migrations change the number, distribution and composition of the population in
- a) the area of departure
 - b) the area of arrival
 - c) both the area of departure and arrival
 - d) none of the above
26. A large proportion of children in a population is a result of
- a) high birth rates
 - b) high life expectancies
 - c) high death rates
 - d) more married couples
27. The population of an area refers to
- a) the number of persons added each year
 - b) the rate at which the population increases
 - c) the total people living in an area
 - d) the number of females per thousand males
28. According to the Census 2001, a “literate” person is one who
- a) can read and write his/her name
 - b) can read and write any language
 - c) is 7 years old and can read and write any language with understanding
 - d) knows the 3 ‘R’s (reading, writing, arithmetic)
29. Which one of the following is southernmost latitude of India?
- a) 8° 4’ North
 - b) 8° 4’ South
 - c) 6° 4’ South
 - d) 6° 4’ North

35. Locate and label the largest state of India.



36. The largest fresh water lake in India
- a) Wular Lake b) Dal Lake c) Bhimtal d) Nainital
37. What is the length of Indian coastline?
- a) 8716 km b) 7165 km c) 9515 km d) 7516 km
38. Which is the longest river of Peninsular Plateau?
- a) River Narmada c) River Krishna
b) River Tapi d) River Godavari
39. Which Meridian is fixed as a standard meridian of India?
- a) $82\frac{1}{2}^{\circ}$ E b) $84\frac{1}{2}^{\circ}$ E c) 86° W d) 81° E

40. Which of these is a fresh water lake?
- a) Sambhar b) Wular c) Chilika d) Pulicut
41. Tropic of Cancer passes through which of these states?
- a) Orissa b) Tripura c) Bihar d) Punjab
42. Alaknanda & Bhagirathi converge to be called as Ganga at
- a) Haridwar c) Badri Nath
b) Kedar Nath d) Devprayag
43. Which of these countries do not share land border with India?
- a) Russia b) Bhutan c) Myanmar d) Pakistan
44. Which of these peninsular rivers flows towards the west?
- a) Godawari b) Krishna c) Mahanadi d) Tapi
45. Two places of equable climate in India are
- a) Kolkata and Patna c) Mumbai and Bengaluru
b) Pune and Nagpur d) Hyderabad and Chennai
46. Name the pass that connects India to Lhasa
- a) Bhor Ghat c) Bomdilla
b) Nathula Pass d) Shipkila
47. Western disturbances enters India from
- a) Arabian Sea c) Mediterranean Sea
b) Indian Ocean d) China

48. Which one of the following is the main reason for the horizontal motion of air over the earth's surface?
- a) Variation in the atmospheric pressure
 - b) Variation in altitude
 - c) Variation in temperature
 - d) Variation in latitudes
49. Central highlands consist of the following plateaus
- a) Malwa, Sahyadri, Bundelkhand, Bhagelkhand
 - b) Malwa, Sahyadri, Bundelkhand, Chota Nagpur
 - c) Cardamom , Nilgiri, Malwa, Nallamala hills
 - d) Javadi hills , Bundelkhand
50. The climate of India is strongly influenced by
- a) Ocean winds
 - b) Desert winds
 - c) Monsoon winds
 - d) Western winds
51. Which of the following factors is associated with the occurrence of cyclonic depression over the Andaman Sea?
- a) Weakening of low pressure trough over the northern plains
 - b) Shifting of low pressure conditions to the Bay of Bengal
 - c) Shifting of heat belt
 - d) None of these
52. Find the odd one out
- a) Kanchanjanga
 - b) Nanga Parbat
 - c) Namcha Barwa
 - d) Anai Mudi

53. The pressure and wind system of any area depend on the
- a) Width and length of the place
 - b) Latitude and altitude of the place
 - c) Humidity and temperature of the place
 - d) Weather and climate of the place
54. The highest peak of the Western Ghats is
- a) Doda Betta
 - b) Mahendragiri
 - c) Javadi Hills
 - d) Anai Mudi
55. The pre monsoon showers in Kerala and Karnataka by the end of Summer season are called
- a) Orographic showers
 - b) Mango showers
 - c) Convectional showers
 - d) Frontal showers
56. The sum total of weather conditions and variations over a large area for a long period of time is referred as
- a) Weather
 - b) Climate
 - c) Humidity
 - d) Temperature
57. The average annual rainfall in Rajasthan is approximately
- a) 100 cm
 - b) 50 cm
 - c) 75 cm
 - d) 200 cm
58. The part lying between Tista and Dihang rivers is the
- a) Kumayon Himalayas
 - b) Nepal Himalayas
 - c) Assam Himalayas
 - d) Himachal Himalayas

59. A narrow gap in a mountain range providing access to the other side is
- a) Mound b) Pass c) Strait d) Valley
60. The range lying to the south of Himadri is known as
- a) Purvanchal c) Himachal
b) Arunachal d) Uttaranchal
61. The Jet streams are
- a) Slow winds in lower atmosphere
b) Moisture bearing winds
c) Fast winds in upper atmosphere
d) Cyclonic winds
62. The Himalayan Arc covers a distance of about
- a) 2300 km b) 2400 km c) 2500 km d) 2600 km
63. When does Tamil Nadu coast get its rainfall?
- a) January to February
b) October to November
c) August to September
d) April to May
64. The formation of the northern plains of India is a result of extensive
- a) Sedimentation
b) Alluvial deposits
c) Pebble deposits
d) None of these

65. The imaginary lines drawn on maps joining places of same pressure are called
- a) Isobar b) Isohyets c) Isotherm d) None of these
66. The northern plain has been formed by the interplay of three major river systems namely
- a) The Indus-Ganga-Brahmaputra
b) The Godavari-Krishna-Kaveri
c) The Luni-Saraswati-Ghaggar
d) None of these
67. The plateaus between Aravallis and Vindhya
- a) Malwa c) Bundelkhand
b) Chota Nagpur d) Bhagelkhand
68. Winter rainfall in north western part of India is caused due to
- a) Cyclonic depression c) Jet streams
b) Western disturbances d) South western monsoon
69. The longest range in Middle Himalayas is
- a) Dhauladhar c) Mahabharat
b) Pir Panjal d) Karakoram
70. Which of the following plays a major role in determining the climate of a place?
- a) Altitude c) Latitude
b) Relief d) Ocean currents

76. What is sex ratio?
- a) Number of females per thousand males
 - b) Number of females per hundred males
 - c) The study of population growth
 - d) The difference between death rate and birth rate
77. Which part of Himalayas is covered with dense forest?
- a) Northern
 - b) Southern
 - c) Eastern
 - d) Western
78. What was the population density according to 2001 census?
- a) 124 persons / km²
 - b) 224 persons / km²
 - c) 324 persons / km²
 - d) 424 persons / km²
79. How many types of plant species are found in India?
- a) About 47000
 - b) About 44000
 - c) About 50000
 - d) About 20000
80. A large proportion of children in a population are a result of
- a) High birth rate
 - b) High death rate
 - c) High life expectancy
 - d) More married couples
81. Which one of the following states does not have Tropical deciduous forests?
- a) Jharkhand
 - b) Western Orissa
 - c) Chhattisgarh
 - d) Rajasthan
82. The elephants are found in the hot-wet forests of
- a) Punjab and Haryana
 - b) West Bengal and Jharkhand
 - c) Rajasthan and Gujarat
 - d) Assam and Karnataka

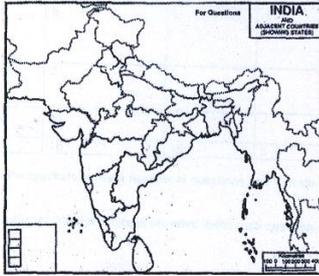
83. Transport, communication and commerce come under the
- a) Primary activities
 - b) Tertiary activities
 - c) Secondary activities
 - d) Rural activities
84. In which of the following states is Dachigam Sanctuary located?
- a) Jammu and Kashmir
 - b) Assam
 - c) Delhi
 - d) Karnataka
85. Silver fir is found in the following types of vegetation zone
- a) Mangrove
 - b) Thorn
 - c) Montane
 - d) Deciduous
86. Which of the following factors are responsible for sparse population?
- a) Flat plains and abundant rainfall
 - b) Rugged terrain and unfavorable climate
 - c) Fertile soil and abundant rainfall
 - d) Rugged terrain and favorable climate
87. A very large ecosystem on land having distinct type of vegetation and wildlife is called
- a) Ecology
 - b) Biome
 - c) Biodiversity
 - d) Biosphere reserve
88. In how many years the official enumeration of population carried out for census?
- a) 1 year
 - b) 5 years
 - c) 10 years
 - d) 2 years

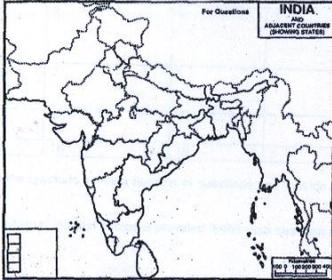
99. Name the state having highest percent of literacy level
- | | |
|---------------|------------|
| a) Kerala | c) Punjab |
| b) Tamil Nadu | d) Gujarat |
100. The magnitude of population growth refers to
- a) The total population of an area
 - b) The number of persons added each year
 - c) The rate at which the population increases
 - d) Number of females per thousand males

-----end-----

APPENDIX : II**ANSWER KEY - ACHIEVEMENT TEST IN GEOGRAPHY****Std. : IX****Max. Marks : 100**

| | | | |
|-----|---|----|---|
| 1. | B | 51 | B |
| 2. | A | 52 | D |
| 3. | C | 53 | B |
| 4. | B | 54 | D |
| 5. | B | 55 | B |
| 6. | C | 56 | B |
| 7. | C | 57 | B |
| 8. | C | 58 | C |
| 9. | C | 59 | B |
| 10. | B | 60 | C |
| 11. | D | 61 | C |
| 12. | C | 62 | B |
| 13. | A | 63 | A |
| 14. | C | 64 | B |
| 15. | D | 65 | A |
| 16. | B | 66 | A |
| 17. | B | 67 | A |
| 18. | B | 68 | B |
| 19. | B | 69 | B |
| 20. | B | 70 | A |

| | | | |
|---|-----------|----|---|
| 21. | D | 71 | A |
| 22. | A | 72 | C |
| 23. | B | 73 | A |
| 24. | B | 74 | C |
| 25. | C | 75 | B |
| 26. | A | 76 | A |
| 27. | C | 77 | B |
| 28. | C | 78 | C |
| 29. | D | 79 | A |
| 30. | C | 80 | A |
| 31. | B | 81 | D |
| 32. | C | 82 | D |
| 33. | B | 83 | B |
| 34. | B | 84 | A |
| 35. | RAJASTHAN | 85 | C |
|  | | | |
| 36. | A | 86 | B |
| 37. | D | 87 | C |
| 38. | D | 88 | C |
| 39. | A | 89 | D |
| 40. | B | 90 | B |
| 41. | B | 91 | A |

| | | | |
|-----|---|--|-----------|
| 42. | D | 92 | A |
| 43. | A | 93 | A |
| 44. | D | 94 | B |
| 45. | C | 95 | C |
| 46. | D | 96 | B |
| 47. | C | 97 | ALLAHABAD |
| | |  | |
| 48. | C | 98 | C |
| 49. | B | 99 | A |
| 50. | C | 100 | B |

APPENDIX : III**REACTION SCALE**

Dear Students,

You studied Geography with the help of multimedia. Here, is a reaction scale to know your reaction about your teaching learning of Geography through multimedia. Read each statement and put your reaction through a tick mark against the given five options, SA (Strongly Agree), A (Agree), CS (Can't Say), DA(Disagree) and SDA (Strongly Disagree)

| Sr. No. | Statements | SA | A | CS | DA | SDA |
|----------------|--|-----------|----------|-----------|-----------|------------|
| 1. | I liked multimedia package through which I studied Geography. | | | | | |
| 2. | Appropriate content coverage was done in multimedia for different chapters of Geography. | | | | | |
| 3. | Content presented in multimedia package was organized properly. | | | | | |
| 4. | The content presentation was interesting in multimedia package. | | | | | |
| 5. | The language used in the multimedia package was easy to understand. | | | | | |
| 6. | The introduction for each topic was appropriate in the multimedia package | | | | | |
| 7. | The explanation given for each topic in the multimedia package lead to better understanding. | | | | | |
| 8. | The different slides giving example on each topic and concept shown were appropriate. | | | | | |

| Sr. No. | Statements | SA | A | CS | DA | SDA |
|------------|--|----|---|----|----|-----|
| 9. | The picture and the text presented for each topic and concept on a slide was appropriate. | | | | | |
| 10. | Pictures in multimedia package were clear in learning different topics | | | | | |
| 11. | The colored and animated pictures helped to develop interest in learning Geography. | | | | | |
| 12. | The back ground colour used in the slides was pleasant. | | | | | |
| 13. | The sound in multimedia package was clear and audible. | | | | | |
| 14. | Proper representation of image, maps, diagrams, graphs, and tables were there in multimedia package. | | | | | |
| 15. | Proper inclusion of animated maps, images and diagrams in multimedia package that were useful in representing phenomena over time. | | | | | |
| 16. | Adequate or appropriate material was there in the developed multimedia package. | | | | | |
| 17. | Time allotted to learn through multimedia package was sufficient. | | | | | |
| 18. | Each abstract (imaginary) topic became easier while learning through multimedia package. | | | | | |
| 19. | Combination of text, graphics and sound made our learning interesting for each topic. | | | | | |
| 20. | The participation of students in the classes was more due to multimedia package. | | | | | |

| Sr. No. | Statements | SA | A | CS | DA | SDA |
|------------|---|----|---|----|----|-----|
| 21. | Multimedia package helped to meet my needs as a learner. | | | | | |
| 22. | We are able to apply the learnt knowledge in other situations due to learning through multimedia. | | | | | |
| 23. | The multimedia package helped us to explore ourselves. | | | | | |
| 24. | This multimedia package helped me to develop positive attitude towards learning Geography. | | | | | |
| 25. | The multimedia package allowed me to be creative in my thinking | | | | | |
| 26. | This multimedia package allowed me to think critically about the topics of Geography. | | | | | |
| 27. | I felt very motivated learning Geography through multimedia package. | | | | | |
| 28. | The multimedia package enhanced my overall understanding of the subject Geography. | | | | | |
| 29. | I would like to learn other topics of Social Science also with this kind of package. | | | | | |
| 30. | Teachers of other subjects should also use such multimedia package while teaching. | | | | | |
| | Over all Reaction | | | | | |

APPENDIX : IV

USER MANUAL FOR MULTIMEDIA PACKAGE

Steps to install Animation Software (Multimedia Package) on your PC

1. Insert the CD in your CD / DVD Drive
2. The CD will start automatically.
3. If it does not start automatically then follow the following steps:
 - a. Go to My Computer / CD-DVD and double click on the icon.
 - b. Installation of Microsoft- Dot Net (.NET) version 2.0 will be started.
Follow instructions on the screen to complete the installation.
 - c. Now, the software files will be installed on the PC and icon will be created on the Desktop.
 - d. Double click on the icon to start the software.

Content of the Multimedia Package (CD)

The Developed Multimedia Package (CD) comprises of six chapters of the Geography covering the syllabus prescribed by CBSE for standard IX for teaching of Geography.

| CHAPTERS | SUB-TOPICS |
|-------------------------------|--|
| 1. India- Size and Location | <ul style="list-style-type: none"> • Location and Size/ India and the World/ India's Neighbours |
| 2. Physical Features of India | <ul style="list-style-type: none"> • Introduction • Major Physiographic Divisions of India/ Himalayas • The Northern Plains • The Peninsular Plateau • Difference Between Western Ghats and Eastern Ghats • The Coastal Plains/: The Islands |

| | |
|-------------------------------------|--|
| 3. Drainage | <ul style="list-style-type: none"> • Drainage System in India • The Himalayan Rivers • The Peninsular Rivers • Lakes/ Role of Rivers in Economy/ River Pollution |
| 4. Climate | <ul style="list-style-type: none"> • Introduction / factors Affecting Climate of a place • Factors affecting India's Climate • The Seasons/ Monsoon as unifying bond. |
| 5. Natural Vegetation and Wild Life | <ul style="list-style-type: none"> • Introduction/ Factors affecting flora and fauna • Types of vegetation/ Tropical Evergreen forest/Tropical Deciduous forest/ Tropical Thorn Forest/: Montane forest/Mangrove forest. • Wild life in India. |
| 6. Population | <ul style="list-style-type: none"> • Introduction / India's Population size and distribution /India's Population distribution by density. • Population growth and process of population change/ Age composition. • Occupational Structure/ Health/ Adolescent population/ National Population Policy. |

Viewing the Content

1. After starting the software, you will find the interface window, where there will be two boxes on the lower half part of the screen. In the left pane there will be list of chapters and in the right pane there will be list of sub-topics of a chapter.
2. Select any of the chapter by Single Right Click to view the list of sub-topics of that particular chapter.
3. Select the topic from the right pane and Double Right Click on it to view the topic animation.

OR

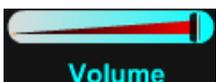
Right click the sub-topic once and then right click on the show button available on the bottom right corner of the home page (interface window)

Buttons on Each Slide

Each slide that will be viewed comprises of Time-line bar, Volume Button, Toggle button- Pause/Play Button, Close Button and Replay Button.



Time-line Bar: Allows the user to forward or backward the viewed content and animation on a slide.



Volume Button: Allows the user to control the volume of the running package according to the requirement.



Pause/Play Button: Allows the user to shift between play/ pause option for CD. (Click on pause option stops the running package allowing the teacher and the students to further get involved in the topic by further discussion on the topic viewed. The user can further continue the viewing by clicking the play option.)



Close Button: This button will take the user back to the home page of the Multimedia. Further helps the user to select next topic.



Replay Button: Allows the user to review the sub- topic from the beginning.