CHAPTER 1

INTRODUCTION OF THE RESEARCH PROBLEM

1.1 INTRODUCTION

Since the beginning of human history, the process of exploration of knowledge and enormous efforts to bring innovative alterations in teaching-learning process have been carried on. The teaching-learning process evolved with the advent of technology and knowledge. Explosion of knowledge in the 21st century has raised the issue of quantity and quality of education. Therefore it has become necessary to devise variety of methods, techniques and strategies to bring about quality improvement in learning.

Educators have examined at various issues to increase efficacy in learning experience. Theorists proposed many innovative ideas, methods and techniques to enhance the teaching-learning process. Teachers, psychologists and reformers experimented and documented their observations to improve this process.

Researchers put a lot of efforts into the field of education to explore various innovative techniques. It was observed that various learning materials made remarkable contribution in changing the classroom environment.

During the past few years the advancement of technology has laid emphasis on almost all the fields of human life. In education, use of technology such as radio, film, filmstrips, and overheads has been used as a support for learning and proved to be effective.

Today’s system of education recommends student-centred education; it has become essential to consider each child as a special one and help him/her grow according to his/her own capabilities and aptitude. This calls for making relative changes in teaching methodologies. (Rao, 2004, pp. 2) Therefore, the researcher has selected Computer-Assisted Instruction (CAI) as the method of instruction for teaching the selected subject.
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Considering the literature, the researcher felt that a new path could be explored to channel technologically advanced visualizations of geography students into enabling them to grasp difficult concepts in a better way. Computer-Assisted Instructional programme could be one of the best methods for presenting difficult concepts of physical geography to the learner in a better way.

The proposed research is about exploring the efficacy of Computer-Assisted Instruction (CAI) in comparison with conventional classroom teaching of the subject of Geography to the students of standard VIII.

1.2 REASON FOR SELECTION OF ‘GEOGRAPHY’ FOR THE RESEARCH STUDY:

The researcher has selected the subject ‘Geography’ for following reasons-

1. The knowledge of Geography provide answers to many physical and social issues
2. Extents of researches reported in the field of Geography Education in India are not satisfactory.
3. The subject has secondary status in the school curriculum
4. The current status of Geography is not satisfactory
5. It is necessary to alter the present condition of the subject
6. To test and explore new technique of teaching the subject to enhance quality of teaching-learning of the subject

In the beginning, teaching of Geography in India was in conjunction with Science. Little attention was paid to the various important aspects of Geography. The Indian teachers at school level followed lecture method where students were simply passive listeners and so lost interest towards the subject.

The above scenario has now changed. The educationists have understood the practical importance of the subject. The syllabus of Geography has become vast and practical oriented. Though all the necessary changes have been made in the syllabus there is are many drawbacks in implementing quality teaching and learning. Therefore
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it has become essential to use latest technology for effective teaching-learning of Geography.

Therefore, the researcher has decided to test the efficacy of Computer-Assisted Instruction (CAI) in comparison with conventional classroom teaching of Geography for the students of standard VIII

1.3 IMPORTANCE OF GEOGRAPHY:

‘Geography is the science dealing with the area wise differentiation of the earth’s surface, arrangement, and interrelations over the world as climate, elevation, soil, vegetation, population, land use, industries, or states and of the unit areas formed by the complex of these individual elements’. It is the study of interrelation of the earth and human being.’ (Webster’s Unabridged Dictionary, 2009)

Knowledge of geography is important for-

- making human life better
- getting answers to various physical and social issues
- sustainable development for future health and well-being of the communities and the environment, locally, nationally and globally

Geography is a subject with varied importance and variegated utility. Human activities are influenced and determined by geographical factors. Geography is a link between natural sciences and social sciences. It is helpful in studying various political and social problems of the society. It is based on cause and effect theory. It tries to put forward answers to various physical phenomena. All the answers are guided by certain reasons and causes. The subject helps to find out solution to various uncertain changes in the environment.

The background to the study of literature, history, and other arts subjects is provided by Geography. It is helpful in the development and flourishing of various Science subjects. It, therefore, occupies a very important place in human life. (Roi, B.C. 2001. pg 9)
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The study of Geography at school level encourages an understanding of physical and social processes in a variety of places and under varying environmental conditions. The concepts, skills, techniques and ways of thinking provided through the study of geography enable students to understand the links between physical and social processes and the importance of place and space in creating major issues faced by today's society. Many of the problems associated with the physical environment require geological understanding, such as the disposal of radioactive waste, Global warming, environmental pollution, coastal protection and landslides. So, it is absolutely essential to study geography from each perspective at each level.

The subject Geography includes intellectual, social, philosophical, psychological, aesthetic, moral and utilitarian value. It includes various skill-based topics that give opportunity to develop the following:

- **Intellectual skills**-
  - Critical assessment of theories
  - Judging the evidences in order to make informed decisions
  - To develop reasoned arguments

- **Specific skills**-
  - Undertaking minor researches
  - Using a range of technical methods for the collection and
  - Analysis of spatial and environmental information

- **Key transferable skills**-
  - Communication
  - Verbal presentation
  - Numerical analysis
  - Teamwork, and many IT skills
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- **Personal attributes**-
  - Self-management,
  - Awareness of responsibility
  - Motivation
  - Flexibility and creativity

In this way it shows that the knowledge of Geography is needed for an all-round development of future generation. Following fig. represents five skills of subject Geography:

![Geography Skills Diagram](image)

**(FIG 1.1 GEOGRAPHY SKILLS)**

1.4 STRUCTURE OF GEOGRAPHY:

There are self-sufficient internal systems in every subject. Similarly, there is a separate arrangement of branches, sub branches, units, sub-units etc. in every subject.
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The structure of a subject means arrangement-showing correlation of various aspects within the subject (Dhamane, V., 2008, Pg. 2.2).

Structure of any subject helps to know about its vastness, scope and correlation with other subjects.

The researcher felt that representing the structure of ‘Geography’ definitely help to understand its vastness and correlation with other subjects.
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(Adapted from Dhamane, V. 2008, Pg. 2.4)

(FIG.:1.2 STRUCTURE OF GEOGRAPHY)
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1.5 TEACHING METHODS OF GEOGRAPHY:

With the development of the subject matter and the knowledge of Geography, various methods have evolved and are being employed to impart its knowledge to the students. The teacher has to employ these methods, keeping in view the psychological requirements of the students. The students of different stages have different requirements and so the method of teaching has to be modified accordingly.

**Following are various methods of teaching Geography**-

![Methods of teaching Geography](image)

*FIG 1.3 METHODS OF TEACHING GEOGRAPHY*
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Though many teaching methods have been recommended for teaching Geography to get quality results, teachers do not always use appropriate teaching methods according to the age, ability and needs of students. They mostly use lecture method in regular classroom settings due to various difficulties they face.

The researcher felt it necessary to have a look at the current status of teaching and learning of Geography and the defects in primary as well as secondary classes in Indian classrooms.

1.6 CURRENT STATUS OF SUBJECT GEOGRAPHY:

The current status of the subject in teaching-learning is not satisfactory. The researcher has to her credit considerable experience of teaching Geography, rendering it possible for her to identify various difficulties encountered in the process of teaching and learning of Geography.

The researcher has noted following difficulties:

- Geography as a school level subject is comprised of very vast syllabus.
- It is treated as a subject of secondary importance though actually it is capable of providing solutions to the issues of day-to-day life.
- Every single unit of the syllabus consists of a number of new concepts.
- The Geography teachers in secondary schools generally prefer to teach by lecture method.
- Teachers of Geography are overburdened with many other assignments besides teaching Geography.
- Required teaching aids are not made available to the teachers.
- Owing to the lack of teaching aids, it becomes difficult for the students to comprehend the geographical concepts.
- Though vast, the subject carries only 40 marks weightage in the syllabus.

The researcher has identified some of the major defects in teaching-learning of Geography in Indian classroom setting as follows:
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1.6.1 DEFECTS OF THE PRESENT SYSTEM OF TEACHING OF GEOGRAPHY TO SECONDARY CLASSES.

The present system of teaching Geography to the students of secondary class is fraught with various defects. Rao (2001) enumerated the following major defects:

- The curriculum and the syllabus are not scientifically planned. It is pretty heavy.
- The books are not scientifically written and drawn up.
- No practical value is attached to the teaching of the subject. In other words, the students are not trained to be able to make practical use of the subject, after they have finished their education.
- Too much of stress is laid on narration and description. Very little scope is left for observation and scientific study.
- The teachers are not left free to make proper use of teaching aids.
- Due to these defects, the teaching is not made effective and interesting. (Rao, V.K. 2001, pg.86)

Some defects mentioned in Trends in Science Education Research (April-June 2001) which are also seen in Geography teaching are:-

- There is a tendency to follow a very authoritarian approach, which is teacher centered, mechanical and unnecessarily repetitive.
- This style teaches children to be passive listeners rather than actively participate as problem solvers.
- Under-use and poor quality of teaching aids.
- A lack of effective class-management skills as well as catering to each individual child's needs. (Trends in Science Education Research, April-June 2001)
According to the suggestions/recommendations given by Senthilkumar, M.K. in the article on National Policy on ICT in Education, 30th Sept. 2008, the scenario of India’s current education system is:

- The current education system in India has a number of infirmities that remain despite a number of attempts to cure the same over the last many years.

- Efforts have been made to enable access, incentives to children from the disadvantaged section to regularly attend schools etc. the quality of education in most Government schools is abysmal.

- In India the daunting canvass of 1.3 Million schools, 200 Million children (6-14 years age group) and 6 Million teachers poses a challenge of an entirely different complexity.

- In the context of the Government school teachers, three most critical issues emerge: (1) lack of subject matter expertise (2) lack of understanding of pedagogical science and (3) lack of motivation.

- Several different strategies are required to address the problem of less than satisfactory classroom culture and teaching learning processes.

1.7 THE PRESENT TEACHING-LEARNING SCENARIO:

- Today’s teaching is excessively textbook-oriented. Teachers usually stick to the content given in the textbook and deliver lectures on the subject matter without accommodating the interests of the students. It is, therefore, bookish and stereotyped and lays emphasis on the acquisition of knowledge rather than its application to daily life.

- Teachers make a maximum use of lecture method. The main drawback of this method is that students are just passive listeners. The doubts of the students remain unanswered many times. In addition, students find the lessons boring, as there are no opportunities to interact with peers and discuss their learning.
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- The syllabus is not life-oriented so the students learn it without much understanding and lose interest in the subject.

- The present curriculum is examination-ridden. As a result, the teacher as well as the pupils select important portion from the whole syllabus from the examination point of view, ignoring the “unimportant” portion. As the worth of the teacher is judged from the pass percentage of the students in the examination and the ability of the students is assessed by the measure of how much he can reproduce in the examination, hence, a real life-oriented learning takes a back seat.

- Teaching is compartmentalized because of which each subject is taught in isolation.

- In our overcrowded classrooms, the student-teacher ratio of 60:1 is inappropriate for good interactions in the classroom.

- The teachers, in addition to their teaching duties, are expected to fulfill many other responsibilities. Thus, they are extremely short of time to plan some creative and innovative activities during their teaching.

- The teacher has to teach taking into consideration the average student, because of which both the gifted and the underachievers suffer.

- For effective and efficient teaching of geography a good laboratory with necessary equipment is essential.

As also in the latest National Curriculum Framework Review, 2005, it was stated “Appropriate multimedia software – both in English and other languages – suited for various age groups in schools is still a rare commodity. Some steps have been taken by free software groups in different parts of the country to develop software localized in Indian languages. What we need now is a synergetic and concerted effort in which Government agencies and NGO’s working in this field pool their resources and expertise together. Development of software is an expensive affair and the Government should make sufficient funds available for the purpose. Software produced should be
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widely disseminated via Internet and CD’s. Free software should be specifically promoted”. (National Curriculum Framework Review, 2005, pgs.27-28)

The above mentioned problems show that today’s teachers are being assigned many responsibilities at a time. They are assumed as a backbone of the school and schools are considered as the most important social institutions. Society is expecting a lot from school where future citizens are being developed under the guidance of the teachers.

Considering the above fact the researcher has decided to conduct an experiment and decided to explore the efficacy of CAI in comparison with the conventional classroom teaching of Geography that could help teachers in doing their job energetically.

The researcher felt that Computer-Assisted Instructional programme could be one of the best methods for presenting difficult concepts of physical geography to the learner in a better way.

The researcher has noted several recommendations of education commissions regarding the use of latest technology in teaching learning process to make future generation techno-savvy so as to make them capable in handling future problems with competency.

1.8 RECOMMENDATIONS REGARDING THE USE OF TECHNOLOGY FOR TEACHING IN INDIA-

Improving Learning and Employability through Computer-Assisted Programme-

The Government of India created the Sarva Shiksha Abhiyan (SSA) program and felt that availability and effective use of educational technology is of critical importance in improving the quality and relevance of learning. According to the sixth survey of educational research and training Vol. I, in 1966 the Indian Association of Programme Learning (IAPL) was formed and disseminated the idea of educational
technology in different parts of India to prepare and publish auto instructional material for effective teaching and learning.

**RECOMMENDATIONS OF NATIONAL POLICIES ON THE USE OF COMPUTER TECHNOLOGY IN EDUCATION**

National Policy on the use of ICT in education states that “Advances in information technology and communications are transforming the world economy and presenting new challenges to all countries. Decision makers have suggested that the introduction of information and communication technology in education in developing countries like India cannot wait until a country has reached some predetermined state of economic and educational development.

It is stated that ‘ICT policies and strategies have to do with education and all other areas of activity that impact on quality of life. There must be perfect co-ordination between NCERT, NCTE, and AICTE, other institutes under MHRD, ministry of science and technology and ministry of information and communication technology for achieving common goal of E-literacy at least secondary level’.

According to the statements given by the policy on use of ICT in education in 2001 ‘The use of Information Communication Technologies (ICT) has contributed greatly to worldwide education and needed to formulate implementation of these technologies at the field level with teachers, school authorities, students and parents

After taking the review of ‘use of ICT’, it was observed that Information and Communication Technology form part of the functions of today’s complex society.

Information and Communication Technologies are being used in various fields for quite some time in education. Apart from making the learning and teaching more interesting the ICTs provide opportunity to the teacher and the taught to gain information. Through the integration of these technologies the communication becomes more seamless. Usefulness of ICTs can be gauged by way of its usage now in various counties as one of the basic things to make teaching and learning more interesting. At the same time ICTs also provide challenge to teachers and students in
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terms of using subject specific ICT resources for each other’s understanding with various kinds of activities. With the help of a variety of source and devices the digital outcome of information is managed in real time, by the teacher while using ICTs. Information and Communication Technologies provide more interactive and less didactic approach, where the class can interact with the content and context of the lessons digitally through the ability to capture, combine and manipulate information from a variety of sources. (University News, 45 (01) January 07-13,2008, pg. 17)

The National Knowledge Commission which was constituted on 13th June, 2005 stated that ‘ICT would bring about revolutionary change in the lives of people in still inaccessible hinterlands of the country in particular’. (University News, 46 (41) October 13-19, 2008, pgs. 6, 7)

According to the letter to the Prime Minister dated 3 February 2008 regarding recommendation given by National Knowledge Commission (NKC) about the use of ICT in teaching, ‘wherever feasible, ICT should be made more accessible to teachers, students and administration for learning, training, research, administration, management, monitoring, etc. This requires the provision of more facilities such as computers as well as connectivity and broadband facilities. Computer-aided learning also requires training of teachers and other staff in order to make the best use of the technology’.

1.9 IMPACT OF TECHNOLOGY:

Education becomes-

- Highly interactive, engaging the student every 20 seconds or so for a response, much in contrast to the present-day passive lecture methods.
- Highly individualized with world-accessible records of learning attempts by particular students to enable computer presentation of education tailored for each student’s past learning experiences and styles
- Highly flexible in interaction, enabling natural-language tutoring
- Highly accessible, opening opportunities for the disadvantaged in this country
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- Highly computer-mediated

Hadley and Sheingold (1993) suggest that technology is most valuable to teaching and learning once teachers integrate it as a tool into everyday classroom practice and into subject-matter curricula. It is only through integrated practices that they can realize the hopeful and idealistic claims for technology (Collins, 1991). This requires readily and flexibly incorporating technologies into their everyday practice in relation to the subject matter they teach. Incorporating technology effectively involves (a) engaging students in active learning, (b) relying less on whole-group instruction, and (c) encouraging more independent and self-motivated learning.

1.10 COMPUTER-ASSISTED INSTRUCTION (CAI):

Computers are fundamental to information revolution since they are basic to the rapid flow of information. Computer is used as an educational aid to improve children’s skills in academic subjects at all levels of education. Computers in education create a new environment in school helping to acquire new skill to make an individual efficient in the international world of science and Technology.

Computer-assisted instruction (CAI) is an interactive instructional method that uses a computer to present material, track learning, and direct the user to additional material, which meets the student’s needs. (Bucholtz, Chris.1998, V. 234 no. 11, pg. 50) CAI is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. Computer-assisted instruction makes use of multimedia software in the learning process including the text, video technology, graphics, sound, and Internet technology. (Lawson, 1999, pg. 30-3)

Computer-Assisted Instruction (CAI) is among the range of strategies being used to improve students’ achievement in school subjects. Programs for CAI have come a very long way since they were first developed over two decades ago. These programs help tutor and drill students to diagnose problems, keep records of student progress, and present material in print and other manifestations. It is believed that they reflect what good teachers do in the classroom (Kulik, Bangert, and Williams, 1983, pg. 19)
• Now-a-days, Computers are used in the classrooms as a support system to improve the teaching learning process.

• It is also possible to use the Computer to teach new skills or concepts, remedial teaching, enrichment of learning, promote creative thinking, problem solving etc.

• A tutorial method provides links to prior learning and present illustrative examples besides providing recall and retention.

• Drill and practice mode provides immediate knowledge of results. It provides the reinforcement for answers.

• Simulations provide opportunity for mental rehearsal; corrective feedback and opportunities for application in new context.

• It also presents novel as well as complex tasks to the learner that change as a result of learner’s action or exploratory learning.

• Provides opportunity for peer interactions with other students.

• It includes teacher support activities in the form of probing questions or follow-up activities. (Journal of the society for educational research and development, 1998, pg. 7)

In this way, Students may get benefits from CAI. It provides better and more comfortable learning for students, since they learn at their own pace and convenience; get opportunities to work with vastly superior materials and more sophisticated problems; personalized tutoring; automatic measurement of progress; and others.

Teachers also gain from CAI, as they experience less drudgery and repetition, greater ease in updating instructional materials, more accurate appraisal and documentation of student progress, and more time to work directly with students (Kulik, Bangert and Williams, 1983, pg. 23). With increasing advances in computer technology, computer-assisted instruction (CAI) is now seen by many as a method of providing relevant instruction to large numbers of students.
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Learning from computers encompasses approaches to CAI in which the computer is used as a means for transmitting specific subject matter. The flow of information is basically from the computer to the student, with the computer presenting learning material or activities for student responses. The computer can retain records of the student’s progress through the course of study. Based on the degree of interaction between student and computer, teacher can use following levels (Types) of CAI:

1. **TYPES OF CAI:**

   **DRILL AND PRACTICE:** The computer provides the student with exercises that reinforce the learning of specific skills taught in the classroom, and supplies immediate feedback on the correctness of the response. Used in this manner, CAI functions as a supplement to regular classroom instruction, and may be especially useful when a teacher does not have the time to work individually with each student. Drill and practice on the computer may also motivate student’s more than traditional workbook exercises.

   As the simplest form of CAI, drill and practice programs also are the most common, although this is changing with increased technology and sophistication. Drill and practice programs work well in increasing student knowledge through repetition, usually through questioning. Students can take as much time as they need or repeat sections, helping to individualized instruction, but a drill and practice program really is not much better than traditional methods of instruction such as flashcards or certification examination review texts. The advantage of drill and practice programs typically in the automatic feedback they provide to learners, relieving them from having to look up the answer at the back of the book.

   **TUTORIAL:** Tutorial CAI provides some information or clarifies certain concepts in addition to providing the student with practice exercises. In this sense, the computer begins to take over actual instructional functions, tailored to the student’s individual level of achievement. The instructional model, referred to as tutorial, was designed to
program the computer to ask a question, accept and process a student response, provide immediate feedback, and allow the individual learner to proceed at the rate most appropriate. (Gourgey, et.al 1984, pgs. 26-27)

Tutorials are one of the most common types of computer-assisted-instruction. In their simplest form, tutorials are “page-turner” similar to textbooks, interspersed with predetermined questions and responses. More complicate tutorials offer analysis of the response to a question, branching and parallel sequencing of text, supplementary and remedial works and allow students to structure the work to meet their needs, rather than being specifically sequenced. The one-to-one tutoring and feedback provided by a tutorial can make it an excellent tool for improving student (cognitive domain).

A tutorial is one method of transferring knowledge and may be used as a part of learning. More interactive and specific than a book or a lecture; a tutorial seeks to teach by example and supply the information to complete a certain task.

**INSTRUCTIONAL GAMES:** Instructional games are courseware with a function to increase motivation by adding game rule to learning activities. Instructional games can be very similar to drill and practice but have an entertaining environment students may be more willing to work at practicing skills if they know they can do so by playing game. Depending on the particular game, students can compete against the computer or against other students.

A variety of computer games may be used as learning tools. Games typically are used to teach content, such as educational terminology. Occasionally, they also involve the learning processes such as decision making and communication skills.

**SIMULATION:** Simulation is a computerized model of a real or imagined system designed to teach how a system works. Simulation differs from tutorial and drill and practice activities by providing learner structured activities. Educational simulations allow students to experience events, or phenomena that they are not able to duplicate in the classroom setting. Software can simulate manipulating objects, performing a set
A computer simulation attempts to reproduce real life situations and asks the students to provide data that may alter the outcome of the procedure. Simulations can bridge the gap from abstract knowledge presented in a class to actual performance by letting the students learn the difference between good and bad decisions. Simulations also can bring about higher order synthesis and analysis skills. Most simulations feature a combination of texts and graphics, using dialogue and inquiry to guide the student through a situation. In addition to text-based simulations, the potential is great for videodisc technology to provide more ‘realistic’ simulations using dialogue and inquiry to guide the student through a situation. A computer simulation attempts to reproduce real life situation and asks the student to provide data that may alter the outcome of the procedure. Simulations can bridge the gap from abstract knowledge presented in the class to actual performance. Simulations can bring higher-order synthesis and analysis skills.

**DISCOVERY**: This provides a large database of information specific to a course or content area and challenges the learner to analyze, compare, infer and evaluate based on their explorations of the data.

**PROBLEM SOLVING**: This approach helps children develop specific problem solving skills and strategies. Problem solving software requires students to apply higher order strategies and synthesize knowledge from multiple curricular areas in order to solve problems.

**HYPERMEDIA**: Hypermedia based instruction (HBI) is a more complex form of CAI. Hypermedia approaches combine hypertext and multimedia. Multimedia delivers content using several formats, such as text, sound, graphics, and video that work to reinforce each other. (Hall, 2000).
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Computer-Assisted Instruction

Computer presents instructional material to traders economically.

Interactive technique

Combination of natural

Innovative technique of teaching

Use of World

Self-learning technique

CAI is

Facilitate learning

Use offline or online

Present content in all areas of curriculum

Test students understanding

Tutorial Air

Drill and Practice

Instructional games

Simulation Core

Problem Solving

Hypermedia

Text or multimedia content

Volcanoes

Multiple-choice questions

Problem solving activities

Immediate feedback

Notes on incorrect responses

Summarizes students' performance

Te

perature

Worksheets and tests

Exercises for practice

CAI Provides

Computer-Assisted Instruction
1.10.2 ADVANTAGES OF COMPUTER-ASSISTED INSTRUCTION:

Using CAI, student-computer interactions can be personalized by giving each student an identification number which when typed into the computer causes the computer to greet the individual student. The computer can present complex branching programs that, depending on a student’s response, can provide various kinds of corrective information, or can send on to the next segment of the program. After a segment of a program has been completed, the computer can give an achievement test, grade it, and compare the score with the scores of others taking the program. Thus, the computer not only provides immediate feedback during the learning process, it can also provide immediate results of achievement test for both the students and the teacher. CAI, by providing immediate feedback, personal attention, exciting visual displays, and game like atmosphere, motivates students to learn in ways that traditional instruction may not. (Hergenhann, 1982, pg.444)

Computer-assisted instruction (CAI) is utilized because of the benefits it offers to learners. Not only does CAI assist students in developing skills in logic, problem solving, and following directions, it also aids in improving academic proficiency in areas such as map reading, reasoning and observing (Askov and Bixler,1996; Tousignant, 1996). These benefits stem from an array of diverse, innovative software programs. Although some of the programs available offer a drill-and-practice format, other software programs offer picture image processing, or branching where students move to different levels without the teacher having to check their work before they continue. These programs offer interactions in which students "become engaged with topics of Geography such as different geographical disasters, natural calamities and use to think over it, to discuss, plan, and solve problems." (Finnegan and Sinatra, 1991, pg.109) Most students like CAI because learning remains challenging yet fun. (Tousignant, 1996)

CAI also has several attributes useful to students; it offers privacy, patience, feedback, individualization, and control. Most learners do not want others to know
about their academic deficiencies. They also take errors more personally and allow mistakes to affect their self-esteem. CAI provides privacy. The computer is nonjudgmental and allows low-level ability students to work on improving their skills without divulging their ability level to classmates (Edwards, 1993, pgs. 76-78).
**Advantages of Computer-assisted Instructions**

- One-to-one interaction
- Great motivator
- Freedom to experiment with different options
- Instantaneous response/Immediate feedback to the answers elicited
- Self-pacing - allows students to proceed at own pace
- Helps teacher to devote more time to individual students
- Privacy helps the shy and slow learner to learn
- Individual attention
- Learn more and more rapidly
- Multimedia helps to understand difficult concepts through multi-sensory approach
- Self-directed learning – students can decide when, where, and what to learn

*FIG: 1.5 ADVANTAGES OF COMPUTER-ASSISTED INSTRUCTIONS*
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Computers are fundamental to information revolution since they are basic for the rapid flow of information. Computers in education create a new environment in school helping to acquire new skill to make an individual efficient in the international world of science and Technology. It is used as an educational aid to improve children’s skills in academic subjects at all levels of education.

Today, advancement in computer technology and availability of computers in schools has made it possible to use Computer-Assisted Instruction (CAI) for teaching-learning and review of research on CAI indicates promising results with respect to elimination/reduction some of the problems in teaching-learning outlined earlier.

After studying the above-mentioned advantages of CAI it was felt by the researcher that it might prove to be very beneficial in teaching of geography. The units in Physical Geography which are considered to be a little difficult can be simplified with the help of a Computer-Assisted Instructional programmes.

1.11 SIGNIFICANCE OF THE PRESENT RESEARCH:

Geography is a subject with varied importance and variegated utility. It helps in studying various political and social problems of the society. The subject helps in finding out solutions to various uncertain changes in the environment. (Roi. 2001, pg. 9)

The study of Geography at school level encourages an understanding of physical and social processes in a variety of places and under varying environmental conditions. The concepts, skills, techniques and ways of thinking provided through the study of geography enable students to understand the links between physical and social processes and the importance of place and space in creating major issues faced by today's society. Many of the problems associated with the physical environment require geological understanding, such as the disposal of radioactive waste, Global warming, environmental pollution, coastal protection and landslides.

However, the manner in which Geography is taught in schools does not really fulfill the objectives of teaching Geography. The Geography teachers in secondary
schools generally prefer to teach by lecture method. Most of the geography teachers have their workload and other priorities do not allow them to teach by using innovative methods at secondary level. Hence provision of quality and creative as well as competent geography teacher is a problem. Development of Computer-Assisted Instructional programme and its widespread acceptance with provision of necessary facilities for CAI may suggest an alternative mode of instruction.

The concept of Computer-Assisted Instruction is not new in developed countries; its history can be traced back to late fifties. Computer technology has been continuously improving since its inception and similarly its role in various fields of life has also been changing. Forms and types of Computer-Assisted Instruction have been changing with the refinement of hardware technology and advancement in software development. Therefore effectiveness of CAI has been improving gradually through an evolutionary process.

To face the challenges of present and future, and to compete with the nations in this information age, every nation will have to enhance the quality of its education system, which is possible only by exploring new dimensions and benefiting from the means of communication. This study will explore new dimensions for the development of quality of education in India.

Computer technology has been continuously improving since its inception and similarly its role in various fields of life has also been changing. Forms and types of Computer-Assisted Instruction have been changing with the refinement of hardware technology and advancement in software development. Therefore effectiveness of CAI has been improving gradually through an evolutionary process.

Effectiveness of CAI has been established in various subjects especially in mathematics, medicine, nursing, language and science. Advanced countries are improving the quality of education by introducing innovation associated with technology including CAI. This study may encourage utilization of this innovation in various schools in India.
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CAI has the potential to cope with the needs of individualized learning, cooperative learning, and constructivist approaches (Maddux, Johnson, and Willies, 1997). Rapid pace of improvement in computer technology and software development suggests that CAI will acquire the potential to change the state of traditional teaching-learning process (Bitter and Pierson, 1999).

Development of Computer-Assisted Instructional programme and its widespread acceptance with provision of necessary facilities for CAI may suggest an alternative mode of instruction.

Findings of this study may be a source of encouragement for the widespread use of CAI at various grades in various subject areas. This study may also be the source of inspiration for researchers to develop educational software and conduct experiments.

1.12 STATEMENT OF THE RESEARCH PROBLEM:

“Development of Computer-Assisted-Instructional Programmes on Selected Units in Geography for Std. VIII”

1.13 DEFINITION OF TERMS IN THE TITLE:

1. COMPUTER-ASSISTED INSTRUCTIONAL PROGRAMME:

Computer-Assisted Instructional Programme was comprised of slide show presentations on selected units in Geography. The slide show presentation included animations, pictures, figures prepared using software such as flash 7.0, 3Dmax, Maya, and Real time 3D, and recorded sounds/narration.

The slide show incorporated principles of various theories in learning and techniques of effective teaching-learning such as –

1) Use of advance organizers.

2) Use of Multiple Intelligence approach.

3) Paired interactivities.
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4) Formative and Summative evaluations.
5) Feedback based on student responses.
6) Step by step animations to explain content.
7) Use of flow charts, concept maps, pictures, video clips, charts, graphs etc.
8) Thought provoking questions.
9) Provision of extra information and explanation of terms through hyperlinks.

2. DEVELOPMENT:

1) Development of Computer-Assisted Instructional programme included validation of programme by subject teacher, subject expert and teacher educator. Changes suggested by them were incorporated in the Computer-Assisted Instructional programmes.

2) A pilot study on students of Standard VIII and incorporation of changes based on their reactions was taken.

The development of CAI included an effectiveness of the study of each Computer-Assisted Instructional programme and a comparison of its effectiveness with conventional classroom teaching. Effectiveness of CAI was determined on the basis of a significant difference at 0.01 level between pre and post means and mean gain scores of experimental and control groups in achievement test on the selected units and reactions of students.

3. SELECTED UNITS FROM GEOGRAPHY:

These units were from Std. VIII Geography textbook of Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune 411 004, based on the syllabus approved by State Government of Maharashtra. A total number of nine units under section 1(The Celestial Sphere and Physical Geography) were chosen.

They were as follows-
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1. The Universe

2. The moon and its Phases

3. Eclipses

4. Interior of the Earth

5. Earthquake and Volcanoes

6. Weathering

7. The work of Running Water

8. The Work of a Glacier

9. The work of Wind, Ground water, and Sea Waves.

The Textbook Bureau has prepared a book titled ‘World Geography-Part II’ for standard VIII in the state of Maharashtra, following the ‘National Policy of Education-1986’ and this syllabus has been implemented serially since the academic year 1989-90.

This textbook has been prepared keeping in mind the aims that the teaching and learning process should be child-centered, the method of self-study should receive more emphasis, the student should acquire the expected abilities and that the process of education should become enjoyable and interesting.

The textbook ‘World Geography-Part-II’ is divided into three sections-

1. Section 1-The Celestial Sphere and Physical geography

2. Section 2-Regional geography

3. Section 3-Practical Geography
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Section 1 included in the textbook is chosen by the researcher for present study. Section 1 belongs to the branch of Physical Geography. It includes information on the celestial sphere and some physical features of the earth.

Physical geography is the study of the natural features of the earth's surface, especially in its current aspects, including land formation, climate, currents, and distribution of flora and fauna. It is a major section of the syllabus of standard VIII. The study of physical geography includes information like-

1. The place of earth in the universe, information about sun, sunspots asteroids, comet, etc.

2. Phases of moon, rotation and revolution of moon as a satellite of the planet earth, information regarding the artificial satellites, space research centers etc.

3. Natural phenomenon like eclipses, types of eclipses and their characteristics.

4. Study of interior of the earth, Surface of land, Formation of rocks and their importance etc.

5. Atmosphere, weather, climate, temperature, pressure, rainfall, bands and divisions of the world, cyclones, etc.

6. Study of physical conditions including study of mountains, rivers, and peaks etc.

7. Study of earthquakes, volcanoes.

8. Study of work of wind, river and glacier.

9. Study of work of sea water, groundwater etc.

1.14 OBJECTIVES OF THE STUDY:

1. To prepare Computer-Assisted Instructional programme on all the selected units in Geography of standard VIII.
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2. To study the effectiveness of each of these programmes in terms of student achievement.

3. To compare the effectiveness of each of these programmes with conventional classroom teaching in terms of student achievement.

4. To study the opinions of students about the perception of using Computer-Assisted Instruction in comparison with conventional classroom teaching.

5. To study the participation of students in Computer-Assisted Instruction with the help of observation.

1.15 HYPOTHESIS:

A directional hypothesis is being put forth with respect to objective 2, since a review of related research reveals positive results of CAI.

**Hypothesis 1 (Directional):** As a result of Computer-Assisted Instruction on a unit in Geography, students will score significantly higher marks at the 0.01 level of significance in the post-test (achievement test) than in the pretest on all selected units in Geography.

Another hypothesis is being put forth with respect to the same objective as follows-

**Hypothesis 2:** 70% students of experimental groups will obtain at least 70% marks in the post (achievement) test in each unit as a result of study through CAI programme.

With respect to objective 2, a null hypothesis is being put forth, even though findings of researches in various school subjects indicate that CAI is superior to regular classroom teaching in terms of student achievement. This is so because most of the studies have used CAI for teaching school subjects other than Geography and for teaching of single unit. The effect of prolonged use of CAI for the subject geography has not been well established. Many units of physical geography will be taught through Computer-Assisted Instructional programme in the present study, and there aren’t adequate studies to justify a directional hypothesis. Moreover, the efficacy of Computer-Assisted
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Instructional programme verses conventional classroom teaching will depend on the quality of the Computer-Assisted Instructional programme slide show prepared by the researcher, and this quality needs to be established.

**Hypothesis 3 (Null):** There will be no significant difference at the 0.01 level of significance between the mean gain scores on achievement of students studying through CAI and through conventional classroom teaching of all selected units in Geography.

**1.16 POPULATION:**

The population for the present research study consists of all the English medium students of Std. VIII (including boys and girls) studying the syllabus of Maharashtra State Board (SSC Board) from Pune city.

**1.16.1 SAMPLE:**

The sample selected was incidental, consisting of Standard VIII E and VIII F students of “Sinhgad Technical Education Society’s”, Sinhgad Springdale School, Narhe Campus, Pune-411 041, for the academic year 2008-09.

**1.16.2 SAMPLE SIZE:**

Experimental and control groups were included approximately 50 students of two divisions of standard VIII each.

**1.17 TOOLS:**

1. Achievement Test on each of the selected units in Geography was used both as pre-test and post-test.

2. Rubric for recording the responses of the students towards the study through CAI.

3. Observation dairy (maintained by the researcher).

**1.18 METHODOLOGY:**

The control group pre-test post-test Quasi experimental design was used.
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Variables-

- Independent – CAI
- Dependent - Achievement test
- Controlled variables - teacher, unit and duration.

Procedure for development of CAI

THE STEPS OF THE RESEARCH WERE:

- **Review of related literature**- The researcher made records of many research related abstracts and information regarding the related literature.

- **Formulation of research design**- The formulation of the research design was done by the researcher after data collection related to the study.

- **Preparation of CAI presentations on the selected units**- The researcher prepared a computer-assisted instructional program for each selected unit of standard VIII Geography Textbook of Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune-411 004, based on the syllabus approved by State Government of Maharashtra, by using PowerPoint and other software’s like flash, 3D studio, etc.

- **Validation of CAI programmes and pilot studies**- The researcher had validated each CAI program by subject expert, subject teacher and teacher educator by showing each programme before the actual experimentation and by taking their suggestion and opinions in writing. The researcher also made related changes as suggested by the experts and subject teachers.

- **Sample Selection**- Samples selected by the researcher were from the two divisions of standard VIII from “Sinhgad Technical Education Society’s”, Sinhgad Springdale School, Narhe Campus, Pune-411041.
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- **Preparation of Achievement test on every selected unit to be used as pre and post-test**: An achievement test on all nine selected units were developed by the researcher. Each test was designed to measure objectives i.e. knowledge, application, comprehension and skills.

- The unit test on each selected unit was given to both the divisions before actual teaching through Computer-Assisted Instruction and actual class teaching.

- **Administration of Computer-Assisted Instructional programme**: On the first day of treatment the researcher gave a detailed briefing to the experimental group students about the use of Computer-Assisted Instructional Programme. The researcher told the students how to get started and proceed through the Computer-Assisted Instructional Programme. The lab assistant also helped the researcher to make students pair and help to understand the use of computer programme if required.

- **Administration of post-test for every selected unit**: The post test was conducted after teaching of each unit on the students of experimental group and control group.

- **Observation of students while administering the CAI programme**: At the time of treatment period the researcher’s role was to-
  - Keep record of students’ attendance
  - Keep record of the student’s observation about their expression while watching the Computer-Assisted Instructional Programme
  - Keep record of students’ discussion in pairs regarding the Computer-Assisted Instructional Programme
  - Observe the behavior of students in a group, in the lab, and keep record of their interest, responsibility and attitude towards learning with CAI.
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- Administration of Rubric - After the treatment of each unit experimental group was asked to fill the rubric made by the researcher.

- Analysis of data.

- Report writing - Report writing was done from time to time by the researcher.

1.19 ANALYSIS OF DATA:

Quantitative data comprised of pre-test and post-test scores on achievement tests in the selected units.

To test the significance of difference between means, “t” test was used.

To test hypothesis 2, Chi square test was used.

Graphical representation was used to compare the effectiveness of CAI and conventional classroom teaching over time.

Qualitative data will be collected in the following manner.

1. Observations made during the administration of the Computer-Assisted Instruction
2. By asking students to record their reactions towards Computer-Assisted Instruction with the help of a rubric

1.20 SCOPE AND LIMITATIONS:

1. The CAI presentations were prepared in English.

2. The Computer-Assisted Instructional Programmes were prepared only on the selected units of Geography for standard VIII.

3. The study was restricted to English medium students from Pune city.