CHAPTER 1
PROLOGUE
1.0 INTRODUCTION

The rapid progress of science and technology depends on the role of computer. It is now accepted fact that educational technology has made a major break through in teaching learning process of education in developing countries like U.S.A., U.K. and Japan in the mid fifties. Indian educationalist who participated in the educational exchange programme with the developed countries could perceive the importance of educational technology and studied the literature of it and achieved empirical findings, the literature of it and also viewed empirical findings of the intensive research work conducted on computer science.

The word "COMPUTER" is merely defined as an Electronic super brain or electronic calculating machines. Computer is a device to capable of solving problems or manipulating data by accepting data performing prescribed operations (mathematical or logical) on the data and supplying the results of these operations on the screen. Basically any computer can
perform only three functions.

These are:

1. Arithmetic operations (+, -, *) and
2. Computer values (logical) and
3. Store, search and retrieve information.

The CAI means Computer Assisted Instruction. It is used to argument individual instruction by providing students with programmed sequences of instruction under computer counter. Manner of sequencing the materials permits students to progress at their own rate. Computers is also used to help students to learn. When it is used for this purpose, we call it Computer Assisted Learning (CAL). Programmers are created to assist both teacher and the student. A student, for example, could use the machine and practice Maths, Science and spelling testing etc.

Historically, teaching has often been adapted to fit in with technological changes. Since the invention of the printing press the textbook has been one of the basic tools of most educational systems but in a century of technological expansion many inventions have been adopted and utilized for educational use. These include the use of photography, projectors, radio, television and computer. The National Council for Educational Technology [NCET, 1968] report on titled "computer for Education" was published in November which reflects in the title how the computers are being used in Education; it emphasises computers for education but not
education for computing, i.e. computer should be used as an additional aid or tool by the teachers within the existing educational structure.

In the education context, the "computer as tool" contrasts with the "computer as focus" of the learning activity. In CAI mode for example, the computer leads the user through the activities to be carried out. In simulation mode, a model is built into the computer, so it is the machine that maintains the thread of the activity [even though extensive non-computer activities may take place]. Even in conjectural mode, the distinction is still present, as although the user is more in control, the computer is the milieu within which the models are being built. By contrast, in tool [or emancipator] mode, the thread of activity is independent of the computer, even though the computer may be used extensively from time to time. The use of the computer as a quiescent tool or resource, to be called into play as and when required, is very valuable and effective. As computers are integrated into the educational process and activities, more and more computer use is seen as being in this category.

Learning by machines is not new in itself. Some pessimistic people may say that the computer in education is a fashion of today, due to disappear tomorrow like programmed learning and few other innovative learning systems. Of all teaching machines, the computer is the most sophisticated one
which can modify the difficulty of materials presented to the learner, according to responses of the student. Unlike any previous technology of instruction the micro allows the development of a fully interactive learning situation between machines and a student. During the past few years, there has been considerable interest in educational application of microtechnology. The findings of Jamison [1974] and Kulik [1985 p.11] suggest that CAI improves achievement, particular for slower students. Burns and Bozeman [1981] concluded that CAI drill and practice programmes in mathematics are most effective for both high achieving and disadvantaged students, whereas they do not significantly enhance achievement of average level students. The effects of CAI in junior high schools have been found to be especially positive for the achievement of disadvantaged and low to medium aptitude students [Bangert-Drowns et al. 1985]. Niemiec and Wallberg concluded that CAI benefits most average and below average achieving students. Samson, Niemiec, Weinstein and Walberg's [1985] findings indicate that those benefiting the most from CAI in secondary school are students who are below average in achievement, above average in ability, or those of low SES. According to Hativa's findings, computer based drill and practice in arithmetic widens the gap between high and low achieving students in that the former benefits the most from the CAI work.
Burns and Bazeman [1981] examined the effects of students' gender with respect to CAI achievement in mathematics at the intermediate school level. The findings showed that boys' gains from CAI were significantly higher than those of non-CAI boys. Similar Nira, Hativa¹ and Dvora Shorerv [1989 p. 20] examined the student's Socioeconomic status [SES], aptitude and gender differences in CAI gains of Arithmetic. The finding showed that advantaged students performed better than the disadvantaged on 10 of the 11 strands.

In spite of being of recent origin, the research and development as well as uses of computers have been truly phenomenal. So that even a common man is aware of their existence. The pace of development and new applications to which computers are being put is so intense that it will not be far when a common man will be interacting and using the computers. While it is true that of all machines the computers will have radical and far-reaching impact on society, most of the apprehensions and doubts are based on misconceptions. While development of new social norms to adjust to impact of computers are in progress, we can make efforts to know more about these machines and understand their capabilities and limitations. These efforts will not only remove misguided apprehensions but also enable us to interact with and use computers in our day-to-day life.

In view of the challenges of twenty-first century, the students will have to learn with computers. The future will
continue to witness knowledge expansion and challenges at a tremendous speed. There is an urgent need to make students aware of computers system.

Keeping the above facts in view, the investigator has decided to undertake this research study.

1.1 THE PROBLEM

"DEVELOPMENT OF COMPUTER ASSISTED INSTRUCTION MATERIAL IN MATHS AND TO STUDY ITS IMPACT ON DISADVANTAGED STUDENTS."

1.2 KEY WORDS : THEIR MEANING

It is essential to know and clarify first the meanings of certain terms known as key words in the problem are to be undertaken. They are as below:

*Development*

In a comprehensive dictionary of psychological and psychoanalytical terms defined development as follow:

1. A sequence of continuous change in a system extending over a considerable time, specially such change, or related and enduring particular changes, as follow one another in an organism from its origin to maturity or to death.

2. Such sequence leading to progressive change for a higher degree of differentiation and complexity in the system.
3 Such sequence leading to irreversible change.
4 The outcome of change in any of the proceeding senses. The changes may be in structure, function or organization, they may be in size differentiation complexity, integration, or efficiency.

**Computer Assisted Instruction (CAI)**

CAI and CAL relatively new programmed learning, involving the use of a computer as a teaching medium or learning resource. As a teaching medium, learning is controlled by the computer programme as it reacts to the train's responses. As a learning resource, the computer is a tool for the learner, providing information. Thus, in this case, the computer is not a direct teacher e.g. as in a flight simulator.

Cooley and Glaser (1969 P. 40) describe a CAI system in the following six steps.

1 The goals of learning are specified in terms of observable learner behaviour and conditions under which the behavior is to be manifested.

2 The learner's initial relevant capabilities are assessed at the beginning of a course of instruction.

3 Suitable educational alternatives are then presented to the learner, who selects or is assigned one of them.

4 The learner's performance is monitored, recorded and continuously assessed as the session progresses.
5 Instruction proceeds as a function of the relationships between the student's performance, available instructional activities, and pre-established criteria of competence.

6 As instruction proceeds, data relevant to the programme are generated for monitoring and improving the instructional system.

**Mathematics**

1 According to H. B. Griffiths "Mathematics is a training for disciplines of thoughts and for logical reasoning."

2 According to Leibutz "Mathematics is a glory of human mind."

3 According to Bruner "who sees Mathematics as a tool for amplifying human ratiocinative capacity."

4 According to Piaget. "Mathematics is a particularly concentrated and powerful example of the functioning of human intelligence. The product of many minds, it is a cultural inheritance."

**Impact**

The meaning of Impact are, a striking together, Collision, the force of a collision shock and the power of an event idea etc.
Disadvantages

According to dictionary of reading and related terms, the meaning of disadvantaged, "a person or group whose socio-economic and/or cultural status is thought to be lower or less favorable by the dominant culture in a society, often because of poorer performance in academic learning."

1.3 IMPORTANCE OF THE STUDY

Various studies have shown the utility of computer system (programming in BASIC) in terms of pupils' achievement and its efficiency in logic.

The investigator has used the experimental method for the study so as to focus its implied on in the field of education.

1.4 OBJECTIVES OF THE STUDY

The major objectives of the present study are as follows:

1. To prepare the CAI material in mathemetic class VIII.
2. To make the students aware of the computer system in education.
3. To study whether CAI material has any effect on the mathematical achievement of the students.
4. To study whether the disadvantaged student has raised his mathematical achievement by CAI material.
5 To study whether there exist SES level difference in mathematical achievement of the students under study.
6 To infer the conclusion and to provide suggestion on the basis of the hypothesis testing undertaken in this study.

1.5 LIMITATION OF THE STUDY

Even with specific objectives of the study, there are some limitations too in every research study. This study has also the limitations, which are restricted in a particular way. They are mentioned below.

1 The present experimental study is confined only to the Kheda District.
2 The present experimental study is confined to Gujarati medium school of Kheda.
3 The present experimental work is limited to standard VIII only.

1.6 SCOPE OF THE STUDY

This study would be an eyeopener to those who deal with such computer programme. The present study would be of great significance to the teacher educators in guiding the students to develop reasoning and problem solving abilities.

Investigator developed computer programme. It seems to be significant for suggesting the guidance for development of mathematic achievement in children.
It is again very important for the educational planners and universities to guide to introduce Computer programs at the school college and university level to judge highest reward of man power. This study will help the students because, to initially motivate and sustain interest in the learning situation. Moreover, he develops the feeling that he is also capable of doing things like other children. Most of computer programme ignore failure and reinforce correct responses. Thus errors are not published in CAI, on the contrary, CAI motivates the child search for correct answers. Most of the computer programmes use bright colours and sound as well. If the ideas and concepts are presented through bright pictures of concrete objects, it becomes interesting and easier to learn for children with special needs.

The computer provides one to one interaction in the teaching learning situation. Computer are good for drill and practise lesson. Teacher working with children having special educational needs have to waste lots of their time in drill and practise. The computer provides varied drill and practise situations without wasting time. The computer is impartial to all children whether the numbers of attempts they make are more or less. Learning becomes more pleasant and enjoyable when the child has no fear of losing his face in front of the teacher, merely because he is a slow learner.

While working with the computer children often come
cross many new ideas and facts which might not have occurred to them in the absence of computer.

The above arguments are enough to justify why computers should be adopted in education even in the developing countries like India.

1.7 PLAN OF THE STUDY

The report of the present study has been presented on six chapters. The scheme of chapterization is as follows:

First Chapter of Introduction reports key words: their meaning, Importance of the study, objectives, limitations and plan of the study.

The second chapter deals with the theoretical perspective about computer system and deals with computer in education.

The third chapter is devoted to the review of related literature. Its review has been described by following adequate procedure and steps. It contains mainly significant contribution made by chief investigators. The chapter contains the following points in detail,

- Need of review
- Utility of review.

The fourth chapter is devoted to planning and procedure. It includes the nature of study. Characteristic, and special cure needed. Finally it also gives the ideas of how carefully the administration of test and scaring works.
The fifth chapter deals with analysis and interpretation of data in the context of objectives of the study. The interpretation of the statistical tables and graphs have been presented in this chapter.

The sixth chapter mainly deals with the observation and conclusion drawn on the basis of the results and interpretation presented in the previous chapter. It also puts some points for further studies to be taken up in the form of suggestions.

The body of the report also embodies a bibliography and a list of appendices.