CHAPTER – 1

INTRODUCTION

CHAPTER - I

INTRODUCTION

It is only about three decades since man started taking a serious note of the possibilities offered by computers. And within a short span of time, computers have carved out a niche in the history of mankind and changed the entire gamut of human life at an overwhelming pace. The computer is a fascinating machine. It is a gateway to a wonderful world of information and myriad applications for the good of humans. Be it business academics, defence strategy, budgeting, research, engineering, medicine or space exploration, computers have established themselves as or indispensable part.

The growing popularity of computers has been turned into account by the business world. Today's business involves the active participation, of computers. Computers since are now being offered as an integral are subject to the students in almost every school and college. In fact subject of computers is a mandatory part of many regular courses. In the employment arena also, computers have exercised their influence. The ability to work with computers is a necessary pre-requisite for most of the present job profiles.

We are going towards the twenty first century the people of the advanced countries like America, Japan and Russia are using computer in

every aspect of life. These advanced countries find significance of computer in every field of life.

The development of nation is measured in terms of development of advanced technology in that nation and development of advanced technology is highly related to development of computer science of that nation.

India is a developing country. In various fields, use of computer started and in short time there is lot of increase in usability of computer in various fields.

The N.C.E.R.T. (National council of Education Research and Training) emphasises use of computer in various fields of life. N.C.E.R.T. induced 'Computer Science' at various levels Not only in colleges of Education or Engineering but also in school syllabus also computer is induced.

Computers are increasingly used in Education due to the fact that it can provide a large data bank information. The computer can be used to help in the actual teaching learning process of all the subjects. It is useful not only for the subjects or higher level but also it can be useful for teaching school subjects. It is also useful in teachers education.

Computers can make learning fan and also unlike teachers, they have infinite patience and always give immediate replies.

A large number of researches are being attempted at various school levels to see the effect of use of computers to teach school subjects.

In school various methods are adopted for teaching Algebra. Inductive, deductive, inductive – deductive, narration explanation, programmed learning, auto instruction, Asubel's, Burner's strategies etc.

Here, in this study, an attempt is made to teach Algebra through computer . There are three methods used for computer based Education.

1) Computer assisted instruction (CAI)

2) Computer assisted Learning (CAL)

3) Computer managed learning (CML)

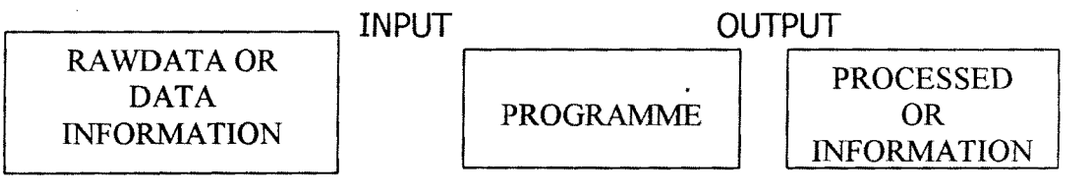
It is a power driven machine equipped with key board, electronic circuits, storage compartment and recording devices to carry out mathematical operations. There fore, computer is a machine that stores and processes information, performs desired calculations electronically and at a very high rate of speed.

1) Computer stores vast amount of data.

2) Computer works at impressive speed.

3) Computer only does what people tell it to do.

It can copy and compute and perform non arithmetic operations on the many alphabetic, numeric and other symbols, that we use to represent idea and things. The computer can accept data, process it and provide the result of the process, it is therefore also referred to as the data processing machine.



A set of instructions to the computer is known as the programme. The instructions to the computer are given in a computer language. The four commonly used computer languages are.

1) BASIC : (Beginner's all purpose symbolic instruction code)

This language is used in educational, scientific and mathematical operations.

2) FORTRAN. This language is used for structuring programmes. Nicolas with designed it for teaching computer science.

4) COBOL (Common Business oriented language) It is the most popular data processing language.

TYPES OF COMPUTERS:-

There are three main types of computers, depending on the amount of data, memory available and the speed of processing, they are.

Main Frame Computer : -

Which are big computers with many capabilities. They are able to perform more instructions per seconc. They may be used for a number of purposes, like for railway reservations space flight controls, etc.

Micro Computers :-

These are the middle sized computer used in business or industry, these can be placed on the table.

Mini Computers :-

These are the self contained computers used for research or for education purpose, they are alsc called the personal or home computers. These are powerful instruments which display great speed and memory capacity.

USE OF COMPUTERS IN VARIOIUS FIELDS

Though computer was originally conceived as high speed calculator, more than eighty percent of the works done by computers today is non mathematical in nature. The essentiality of computers has led to its application in almost every field now computer has become a common in day to day life of almost every body.

Now – a – days computers are used for reservation of plane seats and also for reservation of railway seats in big cites. They are installed

in banks for improving the services to the customers. They are used in several industries. They are used in several industries and business houses for pay roll, accounting, inventory auditing. Costing materials, management and production planning materials management and production planning.

Computers can be of immense utility to students. A student can use a PC to prepare notes, projects etc or access information or the internet, take online lessons and tests.

Computers are being used increasingly in field of engineering, medical science, education, space research programmes, weather forecasting and education research.

The number of applications to which computers are being put are so innumerable and so rapidly increasing that it is even difficult to classify them. The wide applicability of computers in various fields is due to the following characteristics. They are extremely fact, accurate, store large amount of information to which they have rapid access and are capable of doing extremely complex sequences of operation automatically computers are accepted as a useful tool in research and business. The various fields of application of computers are :-

I) ENGINEERING APPLICATION :

Civil Engineering

Structural analysis and design, bricge and road design, plant lay out and architecture by interactive graphics.

Chemical Engineering.

Plant Simulation Studies continue.

Chemical processing calculations.

Mechanical Engineering.

Computer aided design of mechanical elements tensile and fatigue testing.

Electronic Engineering :-

Modelling, analysis design, lay out production and testing of integrated circuits, microwave, calculations, electrical and transformer design.

Industrial Engineering:-

Linear programming, critical path analysis for scheduling of projects with interdependent activities, mathematical modeling, statistical analysis.

II) INDUSTRIAL APPLICATINS :

Integrated Manufacturing, process control and materials handling are major application areas.

Computer aided Manufacturing: -

Manufacturing operations are real time operations and hence require a delicate computer. Same examples are numerical control of machine tolls and computerised patterr making and cloth cutting.

Process Control :-

Continuous Manufacturing process like chemical production require the maintenance of number of parameters (pressure temperature rate of flow)

These parameters in truth depend on dozen of other factors. Computers are used for continuous and comparison of the process parameters and to make necessary changes in control.

III) COMMERCIAL APPLICATIONS :

The characteristic of this type of application is large volume of data. Banking, pay roll and inventory are typical examples.

Banking :

Computers read, analyse and tabulate monetary transactions and computation must be performed many times daily to nave timely record of statues of each account.

Pay roll :-

It consists of processing files, records of which contain the details of an employee. A payslip must be prepared for each employee and record updated.

IV) CONSUMER APPLICATIONS :

Super market checkout systems, air line and railway reservation systems, new printing and typesetting. medical diagnosis systems entertained applications are few examples.

V) MILITARY APPLICATIONS :

The computers are relieving the human being from physical labour. Instead of sitting at a lathe for 6 hours together to run out a shaft, the man can be called upon to programme a numerical control machine, which can complete the job in an hour. Their results increased productivity and the dull repetitive labour decreases i.e. we recalled upon to do more creative work less routine physical labour.

Computers are necessary to any educational system since.

1) They can help to improve the learning process.

2) Future citizens of the country namely to days children should be aware of the nature and uses of computers so that they can cope with the present and future technological society.

3) They can help with certain administrative charges such as maintenance of students, records and scheduling of classes.

Computers are superior to other teaching aids with respect to following points.

1) With the use of simulation technique it is possible to visualise difficult concept in a better way.

2) With microcomputers, it is also possible to teach some concepts in curriculum by constantly drawing the attention of the learners to interesting visual experiences.

3) Even slow learners are allowed sufficient time to design their strategy.

4) A microcomputer data base programme will lead to a variety of activities in class room.

5) A data base programme is superior in developing the skills in collection and structuring of information comparison to conventional class room practices.

Role of teacher in handling microcomputers.

1) If we divide the levels of computer knowledge into awareness, literacy application and innovation, in the order of importance

then the teacher should strive for application level in order to use computer successfully.

2) The computer's pervasiveness is not guaranteed by its mere presence.

3) Computers can be used in the learning process under the following modes.

a) Tutorial mode

b) Simulation mode

c) Computational mode

d) Word processor.

e) Graphics processor.

A computer is a teaching aid in the hands of a practicing teacher and the learning in a class room takes place with the help of a computer. There are scientific evidences to show that the use to computers in classroom enhances the learning process in the children. In particular, when used to present certain kinds of material graphically rather than perceptually, the computers can help a majority of learners comprehend same aspect of that material faster and more accurately. Computer faster and more accurately. Computer enhances the educational productivity of

teaching students to be creative to think critically to make valid decisions and to explain and present their ideas.

Generic package are well suited for use in class room teaching and learning in curriculum. Many computer specialists above ate the use of content free packages in computer awareness and literacy programmes. This is because such packages can be used with very little effort and the user can solve their problems instantly without the need for an intermediary.

COMPUTER AND HOME EDUCATION :

In many ways the computer helps as instruments of education.

1) It allows access to incredible amount of information news papers data bases, the major libraries of the world, museums and other professional in formation.

2) Video recording can be used for broad casting educational programmes through local cable network. Such recording can be stored in homes, schools or libraries.

The computer constitutes an important educational tool due to following features.

a) The computers are interactive unlike books

b) Computers can provide privacy.

c) Computers can be used in verily of social situations.

d) A computer programme can be full of surprises, uncertainty and my story.

e) Computers have infinite patience. A computer does not care have slowly the user responds or now often a user makes mistakes.

COMPUTER BASED TRAINERS ASPIRATIONS AND EXPECTATIONS :

Computer based training and microelectronics are not synonyms although they are often confused by many people. There are already a number of computer and micro – electronics apperception courses which deal with the way in which computer work, now they process information, how they are programmed and they impact on society. These are primarily concerned with teaching about, rather than teaching with the aid of computer, and are not designed to help teachers and trainers to make informed decisions about whether when and how to use CBL in the classroom. There is, of course a need for courses at both levels. At the first level there is a general need which could be described as a computer literacy. At the second level there is a need for a course which can build on this basic level of computing to provide teachers and trainers with an appreciation of CBL and CBT and

to introduce them to the basic skills needed to use the medium effectively.

The guide for trainers and managers on computed Based training produced for man power services commission by Mills and Allen identifies five commonly occurring terms.

CAI : Computer Assisted Instruction

CAL : Computer Assisted Learning

CAT : Computer Assisted Training

CBT : Computer Based Training

CML : Computer managed Teaming

Computer Assisted Instruction (CAI)

CAI is the use of computer on a time –shared basis to perform any instructional function presenting material or problem situations guiding a students thinking by answering his questions, assessing his performance managing his path through a course by selecting the material to be prescribed or by assigning tasks to be performed a way from the computer or any combination of these 'CAI' is the se of time sharing computers in instruction.

In the machine directed applications the various alternatives and paths through an instructional unit are programmed into the machine,

for this it requires a pre-determined model of the education needs of the student Similarly, it requires method of testing the knowledge and maintaining the past performances. These machines directed activities include drill and practice programmed learning. Machine student dialogues, adaptive testing., counselling guidance and various instructional management functions.

Computer Assisted Learning (CAL)

A computer assisted learning approach, which provides for student self evaluation under tutorial conditions. The tutorial provides immediate feed back. It posts a students total score following each tutorial exercise students are allowed a second try after an incorrect response.

One objective of this tutorial is to establish mechanism through which students will be able to supplement class and text material interactively and reinforce cognitive stills.

Thus the CAL has been designed to help students to extend their interaction with the course concepts and develop superior learning habits.

CAL provides a medium to which the instructor can direct a student for exercise or course concepts.

CAL can reinforce and expand learning and help students to overcome text anxiety.

Modes of CAL

There are a number of modes of CAL which in practice overlap save what and are often used in combination.

Old Mode Calculation

In the early dings computers, before their full potential for general information processing was realized, they were regarded principally as calculating engines. It was therefore, natural to use them as sophisticated calculators to relieve some of the numerical labour involved in learning in the numerical science and in statistics.

If the calculation is carried out by the computer then the students will lose out on valuable practice in circumstances where he or she is motivated by seeing it as a part of a larger process learning to bring about the desired result. However once he or she has adequate practice, further repetition is tedious and demotivating and could sensibly be undertaken by the computer.

New Modes

I) Drill and practice :

The simplest form of CAL uses the computers to present the learner with a serious of exercise which he or she must complete by giving some

response as answer. The computer processes that response to determine whether or not it is correct.

Computer assisted learning offers a means of providing endless drill and practice without repetition, at a pace that can be controlled by the learner. It is possible to arrange that the nature of exercise depends on learner's progress. Thus, as he or she learns and his or her accuracy and speed improves, the exercises can become more difficult or conversely, if the learner makes too many mistakes, they can be made easier. This ability to tailor a drill and practice session to the progress of each learner combined with helpful feed back can lead to more effective learning.

2) Tutorial :

There is an assumption that each student is participating in some sort of tutorial where she is taken on a journey through the learning material via a dialogue in which information is presented and feed back is elicited through a process of question answer.

In the simplest form, this tutorial dialogue bears a close resemblance to the programmed learning sequences found in print and on teaching machines in 1960.

As in the drill and practice mode discussed earlier, the computer can be used not only to present the learning information but also to determine the student's needs and preferences and to decide how to branch through

the structural materials. Thus, the material can be made more complies without adding to the students burden.

In order to construct the CAL tutorial the teachers must set out the dialogue that they themselves might have with learners under various conditions and decide upon the criteria which determine how they would adapt the pace and directions of their students learning.

We present the following points which will not favour such types of computer programmes in Education.

1) The learner gets tired of looking at the monitor screen when long passages are presented.

2) In the tutorial mode, the computer is in 'didactic' mode of teaching and learning this imposes an unnecessary restriction on the learners freedom to choose the learning style.

3) Though the material in a tutorial software is presented in pupil in a systematic way attention is paid to the efficiency of the instruction rather than the quality of learning.

4) In a tutorial software, the dialogue is restricted to its ability to match the learners alternative responses against those which had been anticipated by the programme designer.

5) The computer can recognise only pupil responses regarding to a small part of the subject currently under discussion.

6) A human tutor will do the same job with a personal touch as compared to the micro, which ignores the personal aspects.

7) Computers can do much more than what it is doing in a page turning tutorial programme.

8) The tutorial programme is fundamentally limited in its use. It does not aim to make more than a marginal contribution to Education.

The first use of micro computer in Education followed the programmed instruction of skinner (1958). The computer is programmed to be a patient tutorial such that tutor lessons and drill practice are given to the students. The teaching material is usually arranged on a set of elements which require a response from the learner. If the response is matched with the stored one then the computer selects the next material to be presented to the student on the other hand, if the response is not matched the question is repeated. For example. On the monitor screen is presented a chemical symbol of an element and the learner is asked to identify the same. On the second attempt, if the response happens to be incorrect, then the computer exclaims as to what went wrong with the pupils identification the computer then presents the symbol of another elements randomly

selected from the stored list and waits for the pupils response. This activity will be repeated for a few more elements.

3) Simulation :-

Both the tutorial and drill and practice modes of CAL operate by providing information in a structured way according to rules specified by author tutor. Another factor of learning revolves the student studying real life systems or phenomena. Sometimes this is quite feasible, but there are some learning experiences which are too time consuming, too expensive or too dangerous. Among them many examples could be includes viz. the study of genetic through Mendel's breeding experiments etc. Many simulations are used in Education and training. The simulation may be supported by a laboratory system, which must be constructed before hand and may require expensive equipment, or it may be based on pr nted materials, rather like a board game with a rule book and a reference. In the case, the effective management of simulation, the interpretation of the rules and necessary calculations, may be difficult in the time available.

Thus, although, the simulation can be useful as a simplified learning experience, it should not be regarded as a total surrogate for experience of the real life system or phenomena. Part of the credibility problem with computer based simulation lies with the interface between the student and the computer. The students must control the

simulation by entering data on a key board or through other devices such as touch screens, light pens, joy sticks or roller halls, except in a few cases, these are very different from the means that he would use to control the real life system, anc can form as artificial barrier to learning.

4) Modelling

This mode of CAI is similar to the simulation mode in which both help the student to learn by working with an analogue of aerial life system of phenomena, expressed as a set of rules within the computer. However where as in a simulation, the analogue is specified by the tutor, in modelling it is the student who must construct the analogue. In effect, the student must teach the computer rules so that it can emulate the real life system in given circumstances and correctly predict the behaviour of the real life system in new circumstances.

However the computer provides a convenient way of checking the model performing the calculations and following through the set of rules, as an impartial referee.

5) Browsing :

The last of the fifth major modes of CAL uses the computer as a monitor and guide through a range of learning results which might but need not, be themselves based on computer. The power of the

computer to store, retrieve and process information is used to help the student as he browse through the material responding to questions about related information, retrieving items which are needed, summarizing statistical data and suggesting possible times of investigation that may be of interest.

Methods of Computer Assisted Learning :

Distinction can also be made between different methods of using CAL materials in teaching and learning, all of which are familiar in order contents with other media.

(1) Computer assisted teaching :-

This is similar to the laboratory demonstration or the use of a video tape with the whole class. This method works best with simulation and modelling the more individualized modes of drill and practice, tutorial and browsing.

Logistically, the method requires only one computer equipped with several large displays so that the whole class can see the screens clearly. The computer may be operated by the teacher or by a chosen student.

2) Individual Learning :

The opportunity for students to learn by face – to – face discussions with each other and with their tutor. It has often been criticized as an impersonal and dehumanised method of learning.

3) Small group learning :

The use of CAL with small groups offers many of the advantage of the classroom teaching and individualized methods while avoiding their disadvantages. A group of two or three students work with a CAL package discussing the course of their joint learning, their inputs to the package and the resulting output.

Computer in mathematics.

In the new syllabus of IX and X standard following objectives regarding computer education are kept.

1) To help the students, to appreciate the role of mathematics in scientific and technological development.

2) To equip those students who may opt mathematics as a subject for their further studies, with new mathematical tools and techniques, which will help in understanding the advanced techniques.

Regarding above objectives following topics are included in IX standard for mathematics. Standard IX unit computing.

1) Popular introduction of computers, what they are what they can perform and what they cannot perfcrm role and use of computers in modern society.

2) Meaning of problem, Algorithm a detailed and precise step by step method of solution of a problem like buying an article etc. Simple flow charting easy experiences.

About the Research

Statement of the problem for research is as follows :

DEVELOPMENT OF TEXT BASED COMPUTER SOFTWARE IN MATHEMATICS OF TEACH ALGEBRA FOR EIGHTH STANDARD OF MAHARASHTRA STATE A STUDY

OPERATIONAL DEFINITION OF THE TERMS :-

The operational definition of the terms used in the statement of the problem are defined for the sake of clarity, as follows :

1) Development: -

The term 'Development' includes planning, designing, constructing and testing the package.

2) Software:

A set of program that can run in a computer is called software. According to dissertation, software is an instructional material based on test book of Algebra of eighth standard.

3) Computer :

Computer is a machine that stores and processes information performs desired calculations electronically and at a very high rate of speed.

4) Teach :-

Teach means to organise experiences together which help students in getting experience.

SIGNIFICANCE OF THE PROBLEMS :-

In secondary school level comparing to all subjects students assure that mathematics is difficult, with the help of computer on line help and demo. We can revise easily. According to instructional technology, the teaching and learning is effective only when the students are taught in a meaningful way. We should utilise the different media for teaching. It is necessary for the teacher of today to make full use of available resources and to import knowledge easily and accurately to the pupils.

1) The aim of the project is to develop students friendly software so that students of different I.Q. level will study the concept with their capacity of grasping.

2) A computer programme will be prepared by the investigator for the subject Algebra of eight standard.

OBJECTIVES OF THE STUDY :

1) To analyse the course content of Algebra of VIII standard.
2) To prepared test based software in algebra for VIII standard
3) To study the effectiveness of Test Based software.

HYPOTHESIS: -

Hypothesis tested are as follows:

1. There is no significant difference in case of girls in performance of Algebra by two methods.
2. There is no significant difference in case of boys in performance of Algebra by two methods.
3. There is no significant difference in the performance in Algebra in the experimental and controlled group.
4. There is no significant sex difference in the ability to learn through computer.

SCOPE AND LIMITATIONS OF THE STUDY

1) The sample will comprise of only Marathi Medium eighth standard students.

2) Only 40 students will be taken at random. In these 20 will be taken up for experimentation.

3) The study is limited to fifth and thirteenth chapter of eighth standard Algebra book of Maharashtra Secondary School Board, Pune, which pertains to Algebra. The name of the chapters are Identities expansion and Identities factors.

CHAPTER SCHEME

The present study is presented in five chapters.

The chapter I deal with the introduction. Use of computer in various fields of Education teaching mathematics, defining the problems, definition of terms, objectives of the study, Hypothesis, Limitations of the study, significance of the study.

Chapter Ii deals with 'Review of Related literature. The review is taken as studies comparing the use of traditional method with the computer method. Studies presenting the views and opinions about the computer use other studies conclusion and the importance of the present study.

Chapter III deals with plan and procedure of the study, it contains method of procedure, preparation of the text material in programmed learning sequence preparation of questionnaires for the pre and posttests and preparation of the computer programme and execution of the programmers.

The chapter IV presents Analysis of data in pursuance of the objectives stated earlier and testing of hypotheses.

The chapter V presents the summary and conclusions. Educational implications and recommendations for further research.

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