THE RELEVANCE OF COMPUTER EDUCATION IN POST PRIMARY SCHOOLS:

A CASE STUDY OF GOVERNMENT SECONDARY SCHOOL MINNA

BY

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PGD/MCS/2001/1065

DEPARTMENT OF MATHEMATICS/COMPUTER SCIENCE
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

NOVEMBER 2003.

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A PROJECT SUBMITTED TO THE DEPARTMENT OF
MATHEMATICS/COMPUTER SCIENCE IN PARTIAL FULFILMENT OF
THE REQUIREMENT FOR THE AWARD OF A
POST GRADUATE DIPLOMA IN COMPUTER SCIENCE.
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APPROVAL PAGE

This project has been read and approved by the undersigned on behalf of the Department of Mathematics and Computer Science, Federal University of Technology Minna, Niger State as meeting the partial requirements of the award of Post Graduate Diploma in the Department of Mathematics and Computer Science, Federal University of technology, Minna.

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DR. YOMI AIYESIMI   DATE

(PROJECT SUPERVISOR)

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MR. L.N. EZEAKO   DATE

HEAD OF DEPARTMENT

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EXTERNAL EXAMINER   DATE

CIRCULATION

This project (The Relevance of Computer Education in Post Primary Schools: A case Study of Government Secondary School Minna) being in a partial fulfillment of the requirement for the Award of Post Graduate Diploma in Computer Science of the Federal University of Technology, Minna.

It is therefore recommended for circulation to the following places.

1.   Department of Mathematics/Computer Science Federal University of Technology, Minna Niger State.

2.   The Library, Federal University of Technology, Minna, Niger State.

3.   Members of the Assessment Board.

4.   Abubakar N. Usman.

Abubakar N. Usman

DEDICATION

All praise be to Allah, the creator, and the sustainer of the whole universe. This project is dedicated to my late Father, Mallam N. Ibrahim and my Mother Mallama Aisha Ibrahim and to my family whose love and patience and understanding were all needed in great abundance to complete a project of this type.

ACKNOWLEDGEMENT

ABSTRACT

This project endeavours to highlight the relevance of Computer Education in Post Primary Schools. Of course the computer is a machine that relieves human beings of mindless uncreative tasks. Of course students in every discipline have greater career opportunities because the computer exists. But the real fascination is in what computers and their applications are becoming in the new astonishments that will emerge, the new creations, the new effects on our society and on our individual lives. Understanding and appreciating painting or literature or music are traditional routes to life enriching experience. Understanding and appreciating computing may be another such path.

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CHAPTER ONE

1.0. INTRODUCTION:

We are often told we are living in a world the computer made. But that is deceptive, because the computer age was created by human beings, working with computers and other tools. Further, developments will also be in the hands of human beings and these will not merely be computer professionals. All of us will use computers directly or indirectly. What does human choice have to do with computers? As this project is read through, it is hoped that one will see more and more clearly that computer applications are flexible and versatile, and give free rein to individuality. This applies to business people whose entrepreneurial spirit is released and encouraged by their electronic spreadsheets, to writers and editors in every field whose creativity is nourished by word processing, to researchers in economics and the other social sciences whose range is extended by computerized data bases.

A computer is admirably suited to handle any information and first and foremost it is an information processor. That is to say computer can receive information perform some basic operations on that information and produce results according to a predetermined program. The modern computer was developed as a natural progression from the early calculating aids. Indeed this has had the effect of making people still look on today's computers as complex number crunchers. As the computer was developed from calculating machines it is along this line that we will have to trace the family tree of modern computers. It will be of a remarkable appreciation to mention the following people upon their contributions in the field of computer invention. They include Pascal, Gottfried, Liebnitz and Charles Babbage to mention but few.

1.1. STATEMENT OF THE PROBLEM

Powerful interactive multimedia systems are now a reality. The potential for education and training is inevitably enormous especially when these systems became available on high powered machines at a sensible cost. The consequence of the educational use of cyberspace is mind boggling. For example, what is the point of talking to astronaut trainees about what it must be like to walk on the moon when pupils can don their VR helmets, put on their VR suits and physically and emotionally experience what is like to virtually walk on the moon? Imagine one is their – turn the head and look back at the far away Earth – experience this for too long on your own one will probably start to feel incredibly isolated perhaps this particular emotion would not have been experienced if one was trying to convey these images by the spoken word. Taken this developments further then one can begin to appreciate that they could and probably will have an impact on education itself. Imagine a scenario in which information about virtually any topic is almost instantly available to any depth that is required by the user of the system. What skills should now be possessed by the students at school? Perhaps the recall of facts will play a less prominent role than at present. The ability to manipulate data to extract the required information so that appropriate conclusions can be drawn might became paramount. If such a scenario is to exist in the future then, as in the past, there will probably be a need to have redefine what is meant by education – these ideas could be as fundamental as this. Some teacher's may throw their hands up in horror at the thought of what is being implied here, but we have only to look back at history to see that such fundamental changes have happened in the past from the invention of language itself, the availability of books in quantities large enough for everybody to use, the invention of television to the introduction of micro computers and video

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recorders – they have all played their part. The political, moral and philosophical directions taken by entire nations can be influenced by the use of such technologies one has only to see the effect that satellite systems have had in less developed areas of the world. Hence the purpose of this study is to enable one to assess the benefit of computer in post primary schools in Niger State with particular reference to Government Secondary School Minna.

As noted by Shelley and Hunt in their book titled "computer and common sense", the objective of introducing computer or of extending existing computer facilities may be to increase productivity to attain a consistently high quality of production to improve a service and / or to gain knowledge.

I therefore deem it fit to commend the authorities of Government Secondary School Minna by including computer science in their curriculum to achieve the said goals mentioned above.

1.2. AIMS AND OBJECTIVES OF THE STUDY

The main purpose of this research is to highlight the relevance of computer education in Government Secondary School Minna. In addition to the above, it also intended.

(1)   To find out whether the computer centre in the school has qualified and enough personnel to run it.

(2)   To find out the criteria used in selecting students to read computer science.

(3)   To find out the actual number of qualified staff teaching the course in the school.

(4)   To find out if there are enough computers in the school.

(5)   To find out if the number of practical taken per each class a week.

(6)   To find out if there are enough software to run the computers.

(7)   To find out whether the school has gone internet.

(8)   To find out the responses of both students and staff their feelings on computer education.

(9)   To find out the assistance if any and of any type by the State Government or elsewhere to School.

1.3. SIGNIFICANCE OF THE STUDY

The research work is set to find out the relevance of computer education in Government Secondary School Minna as well as to suggest some measures to enhance students' awareness in computer applications. It is of great belief that after this piece works is finally completed, it will not only benefit the school taken as study case alone but also other post primary school in Niger State.

1.4 SCOPE AND LIMITATION

In fact the general instability in the education section, particularly the ASU, NASU Strike which started late last year (2002) to the first quarter of (2003) in this country had in one way or the other affected this research work. More so this research is limited to Government Secondary School Minna. Another limitation of this project is the time allocated to it. Besides some relevant materials that may be of great help to this research are not available, particularly relevant literature; due to the infancy state of computer usage and application in Government Secondary School Minna.

I assume that the findings of this research can be applicable to other schools.

1.5 RESEARCH METHOD

This research work being a case study of computer education in Government Secondary School Minna, many steps were taken into considerations that have direct bearings in the process of impacting computer knowledge and also in the

process of computerization. The availability and extent of utilization of computers, their services and training were also put into considerations.

Finally oral discussions were conducted by the researcher. The instruments used for the purpose of this research are:

1. Questionnaire

2. Interview

QUESTIONAIRRE

The researcher designed two forms of questions, one for the students and the other for the staff within the school. All the questionnaires are open typed. This implies that the respondents are free to say whatever is in their minds. Enough time were given to the respondents to answer the questions.

The researcher personally went to the school to administer the questionnaires. Questions were welcomed by the respondents where they got things wrong.

INTERVIIEW

A series of interviews were conducted with the school principal and with some teachers in the department of computer science. The aim was to know about the general administration of the department.

CHAPTER TWO

2.0 LITERTAURE REVIEW

Computers have been used in education for years, but until the 1980s that use was largely confined to colleges and universities, where computer science is a well established field with the coming of inexpensive micro computers, however, a tread has become a tidal wave. The small personal computer is both inexpensive and versatile. It can be independently programmed, or it can be used as a terminal linked to a central computer system of miles away. Thus it is ideally suited to the aims of mass education from grade school on up, and an elementary or secondary school without at least a few micro computers rightly thinks that its students are being handicapped.

2.1 COMPUTER AWARENESS

It was not known how human beings did arithmetic before the time of the great civilizations. Any thing more than simple addition would have been very difficult, so it is fortunate that simple societies have little need for arithmetic.

But advanced cultures have always needed arithmetic. Goods must be bought and sold and measured. Taxes must be computed and collected. Soldiers and other civil servants have to be paid. Yet even in the advanced civilizations of antiquity – Egypt, Greece, Rome, China, the near East – calculating was a formidable task.

Imagine, for instance, the problems of a Roman accountant faced with columns of Roman numerals to add up. Subtraction would have been no easier multiplication and division must have been nearly impossible. To cope with these difficulties, each of these ancient peoples invented a simple calculating device based on the decimal system. The best version was invented by the Babylonians; it was a

frame strung with rows of beads. This device, essentially unchanged, it still used today in many parts of the world. It is the abacus.

After the abacus, the next great advance towards the modern computer was made in the seventh century. In the three centuries since then, pioneers have worked singly or in groups to make the computer ever more sophiscated, useful, powerful and versatile. Since technologies are interwoven and interdependent, the evolution of the computer was slow and difficult until the arrival of the electronic age.

Now computers are every where. Computers are making revolutionary changes in the way we live, play and work. Not too many years ago, the computer was so inconspicuous that most people were seldom aware of its existence. We all know there was a sort of big computer some where that did such things as predict the outcome of elections with mysterious accuracy. They scheduled our courses in colleges, they made our airline reservations, and they saw to it that our plane did not collide with another. We knew there were tiny special purpose computers in our pocket calculations, our digital watches, and the fancy new appliances at home.

But we didn't have to think about the significance of these things, except when something went wrong for instance, when the meter kept billing us month after month for our electricity consumption. Computer did not touch upon our daily lives or our livelihoods. Things are deferent now. Suddenly we are all intensely aware of the computer as a force in our lives. We are told by some that it is a threat, by others that it is a promise, but by every one that its here to stay. And we had better get ready for it, because life is never going to be the same again. We are in the midst of the computer revolution; we live in the computer age.

The computer is reshaping our world and will go on reshaping it. It is also more deeply involved in the texture of our lives than any other dominant technology

ever was. The Iron Age, the Bronze Age, the Industrial Age, none of them reached out and touched all individual lives as the computer age does and will continue to do.

2.2 TYPES OF COMPUTER

Computers vary in size and cost. They range from something that can fit into pocket costing a few hundred naira to those that fill a room and cost millions of naira. They all have the common characteristics that they can store information and carry out stored instructions of tasks (programs) automatically using a digital data processor to make information meaningful. In contrast to humans they can do this repeatedly accurately and with great speed. The main types of computers are classed to differentiate between them as follows:

MAIN FRAME

A main frame (now often referred to as a large server) offers the ultimate in processing power and storage capabilities. A main frame is any powerful general purpose expensive computer system. It typically has many dumb terminals connected to it through these are increasingly being replaced by PCs. Dumb terminals consist of a keyboard and display unit only, usually with no disk drives or their own processor so they cannot work when not connected to the main frame.

Main frames are used by large commercial organizations such as banks and insurance companies. Main frames used to fill whole rooms and required specialized staff and air-conditioned clean environments but these days more robust and take up much less space. They have vast storage capacity hundreds of megabytes of main memory and terabytes (trillions of bytes of disk storage). It is interesting to note that the computing power of an average home computer now exceeds that of the typical 1970s main frames.

MINI COMPUTER

With advances in technology a family of smaller and cheaper computers called mini computers were introduced. The term mini computer is not used very often nowadays and they have evolved into mid – range servers that are part of a network.

Originally they were typically installed in smaller businesses and research establishments. The processing and storage capacity of the mini computer is mid way between the main frame and PC.

NETWORK COMPUTER

Computer systems can be standalone (not connected to any other computer), or they can be connected together to form a network for data transfer communications and backups. When computers are connected together they are known as networked computers. Networked computers do not have to be in the same building. Using telecommunications, a computer can be linked to another computer anywhere in the world. PCs can be connected to a network for the processes of sharing information but they also operate when not connected to the network. There are peripherals such as printers. They can be used as intelligent terminals. Net worked computers are used in medium to large - sized organizations including schools.

PERSONAL COMPUTER

This is a computer that is small enough to fit on a desktop and inexpensive enough to be bought by an individual for personal use. There are two commonly used personal computers. The most widespread out of the two is the computer based on the original IBM PC, and all clones of this machine are referred to as PCs. The PC is predominant in business and industry. The other common computer is the Apple Macintosh known as the Mac, which is predominant in creative fields such as publishing and design. Personal computers vary in price, performance and storage

capacity and can be chosen to suit requirements. Typically they range from N70,000 to several thousands naira. The price reflects the performance and storage capacity.

LAPTOP COMPUTER

Laptop computer is a small sized PC that can use battery power and be carried around. It is used by people on the move (e.g. sales repre-creatives and business travelers). As with the desktop PC, it can be chosen to suit your personal requirements.

Laptops are more expensive than desktop PCs with the same specification due to their components needing to be light, small and operating on low power consumption. They have flat screen displays.

2.3   STORAGE AND INFORMATION RETRIEVAL

TYPES OF MEMORY

Computer memory is the place where instructions and data are stored. A computer has two types of memory:

1.   RAM (Random Access Memory) and Rom (Read Only Memory). RAM is the computer's fast short term memory. It needs electricity to retain information and anything stored in RAM will be lost when the power is turned off. When the computer is running, the greater capacity it has to temporarily store instructions and data, the quicker, larger programs will function. ROM permanently store instruction on data. Its contents are stored when the computer is made and cannot be altered. RAM is faster than ROM and both are faster than disk. Access time to RAM is usually measures in nanoseconds (billionths of a second).

MEASURING MEMORY

The binary system is the principle behind digital computers. Binary means 'two' and data is represented by two digits 0 and 1 (0 is the off state and 1 is the on state of the computer's memory cells.) Eight bits make up one byte. A bit is short for binary digit. It is the smallest element of computer storage. Computer memory is measured in bytes. A byte holds the equivalent of a single character (e.g.) the letter A or a full stop). Because a byte is such a small unit of storage, computer memory is more commonly measured in terms of thousands of bytes kilobytes or KB (actually 1, 024 Bytes) or millions of bytes, megabytes, gigabytes or GB. A word processor file (a document is called a file when it is saved) of 1,000 words will use approximately 15 KB. A full screen colour picture will take up approximately 300 KB. A field is a unit of data that is more than one byte in size. A collection of fields make up a record (e.g. a person's name, address e.t.c on a mailing list makes up one record, each individual part is a field).

MEMORY STORAGE DEVICES

To store information for future use at a later date or just keep it safe there is need to store it on one of the following non – volatile storage devices.

HARD DISK

Most computers have hard disk installed. A hard disk is a fixed disk consisting of magnetic storage plates encased in a derive unit positioned inside the computer. A hard disk is used as the main permanent store of programs that have been loaded on to the computer so they are always available. If connected to a network, the computer is sometimes able to access other hard disks on available. Hard disks provide fast retrieval of information compared with floppy disks. Because hard disk capacity is large, it is measured in MB or GB.

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FLOPPY DISK (DISKETTE)

A floppy disk is a removable medium store used in Drive A or B. The "31/2" floppy disk has become the norm. It provides a cheap way of backing up small amounts of data. It has a hard plastic case (protecting its floppy interior) with a metal cover which slides back when the disk is placed in the disk drive. The amount that can be stored on a floppy disk depends on whether it is single double sided and whether it is single, double or high density. A double density floppy disk store approximately of 20 KB, and a high density disk approximately 1.44 MB. Some disks come ready formatted, but if not, the first time you use a new floppy disk, you must format it so it is configured for your particular system.

Floppy disks have a notch, called the write protect notch, which will stop you deleting or altering a disks contents. On "31/2" disks there is a small tab in one corner that slides across to write –protect it.

CARE OF FLOPPY DISKS

1.   Always store disks carefully.

2.   Keep the disks away from anything magnetic.

3.   Keep the disks away from direct heat, (e.g radiators or sun light).

4.   Do not touch the exposed recording surface.

ZIP DISK

A zip disk is a removable disk similar to a floppy disk but can store 100 MB or 250 MB of information and is much faster. As with other disk drives, zip drives can be internal or external. It is useful for storing unusually large file or putting your system on to another computer (e.g a laptop).

CD-ROM

A CD – ROM (computer disk read only memory) disk is a round and flat optical device. It uses a narrow laser beam to read the data, which has been etched on to its surface to form minute patterns. It is usually used in Drive D. it can hold in excess of 600 MB, equivalent to about 250,000 pages of text or 500 floppy disks. It has fast data retrieval. As the size of the software has increased, it is now usually distributed on CD-ROMs instead of floppy disks. A CD-R is a recordable CD that can be recorded on once only. A CD – RW is recordable and can be used many times. A word (write – once, Read – many) is an optical disk that allows user to write data on to it once only.

DATA CARTRIDGES

Data cartridges use magnetic tape technology and are often used for backing up data in large organizations. They are slower and cheaper than other storage devices because they have sequential access (scanning information starting at the beginning and working through until it finds the required information) rather than random access (accessing information without having to read everything that comes before it.

2.4 COMPUTERISATION PROCESS

Computers have many ways of manipulating data. Computer performance can be determined by the following factors.

SPEED OF THE CPU

There are different types of processor (e.g Pentium, Power PC). The speed at which they perform is measured in (MHz). The greater the number of MHz, the better the performance.

AMOUNT OF RAM

Most desktop and notebook computers sold today include at least 32 MB of RAM and can normally be upgraded to 128MB. The more RAM you have, the less frequently the computer has to access instructions and data from the more slowly accessed hard disk.

HARD DISK SPEED AND CAPACITY

Hard disk speeds vary. It is always a good idea to buy a large hard disk so you do not run out of storage space and have to relay on using slower floppy disks or have to delete items stored on the hard disk to make room. Possible manipulations depend on the kind of data being manipulated. The easiest operations are those of arithmetic, for example given two numbers, the computer can tell you their sum. An equally easy but perhaps more fundamental operation on data is to move it from one place in the computer's memory to another, for example, suppose that a company is putting together records for a number of new employees. One piece of data about each employee may be whether she is a salaried or an hourly worker.

The letters "S" and "H" are stored in memory, and the appropriate one is moved to each employee's record. The salary or hourly wage is especially important; a number of possible weekly salaries and hourly wage rates are stored in memory, and one of these is selected for each employee and moved to her record. A third important computer operation is to compare two items – that is to decide whether or not the two items are equal and, possibly, if they are unequal, to decide which of the two is greater.

Comparing two real numbers, two characters, or two characters strings are different operations. Two real numbers can be compared in magnitude. Characters are, to begin with, either the same or not. If they are not the same, we can continue

the comparison by looking at their ASC11 code representations. For example the ASC11 codes for the characters "e" and "J" are 101 and 106, respectively. The compare operation for "e" and "J" will therefore say that "e" is less than "J". The compare operation for character strings will decide whether or not two character strings are identical, and, if they are not, which comes earlier in the alphabet. The second of this operation is useful in alphabetizing a long list of words, as in a dictionary or a telephone book.

Having discussed computerization processes, classifying data into types will broaden our knowledge more on computerization process. The word "type" has a specific meaning in the language of computers. Single characters are distinguished from words, and whole numbers (integers) are distinguished from other numbers. Integer is the smallest data type. Its simplicity lies in the fact that the computer immediately translates an integer into its binary representation. Number such as 2507.3, 0.0046, and 3.14159 are not integers. Since they are numbers whose value is determined not by the digits alone but also by the placement of the decimal point, we call them "floating – point" numbers. The data type containing floating – point numbers (but not integers) is the data type real. When we ask the computer to do arithmetic, we must always be clear about whether its integer or real arithmetic we are asking it to do. If we are not careful, we will get absurd results. For example, if we ask the computer to divide 3 by 2 and we make it clear that we are working with real numbers, it will give us $3/2 = 1$, since it can deliver only integers, and 1 is the next integer below the correct answer. The data type character is simple enough, since each character is represented by one byte. Mistakes in assigning data to types may or may not be fatal. Some of these mistakes are caught by the computer and some are not. What kinds of mistakes are caught? Remember what happens if you

ask your computer to multiply George by 3; The computer replies with the message INCOMPATIBLE DATA TYPES.

Conclusively one can say that although the computer can represent any kind of information, it is necessary to tell the computer what kind of information it is currently representing. This is done by dividing data into types. Data types include integer, real, character, and character string. The computer manipulates data of different types in different ways. It can move data of any type from one place in memory to another. It can compare pieces of data of the same type, ranking integers or real in magnitude and alphabetizing characters or character strings. It can concatenate or join character strings.

CHAPTER THREE

3.0 <u>DATA PRESENTATION AND ANALYSIS</u>

This chapter aims at analyzing the findings of this research project. Efforts were made to gather information on computer usage, general views and feelings of the pupils about computer usage, its advantages and factors that might enhance computer learning (Education in schools).

There are two types of questionnaires – one for the students and the other for the teachers.

SAMPLE OF QUESTONAIRES

Federal University of Technology

Minna.

Department of Maths /Computer Science

11th June, 2003.

Sir,

QUESTONAIRE FOR STAFF

In partial fulfillment for the award of post graduate Diploma in Computer Science of the Federal University of Technology Minna, the following under mentioned questionnaires were designed to gather information concerning the computer education in Government Secondary School Minna – viz – aviz its relevance and ways to enhance its effective teaching. The success of this project depends how correctly and honestly questions were answered.

Could you please supply correct information by filling in these questionnaires? Any information you kindly supplied will be treated as confidential and will be restricted to the purpose of this research.

1. What subject do you teach?

2. What class do you handle?

3. Are you computer literate?

4. How old are you in the school?

5. What yardstick does school use in selecting students for computer?

6. At what level do you select?

7. If you teach computer science, have you enough software to assist in teaching students?

8. How many computer periods have you in a week.

9. Could you please suggest ways of improving computer teaching in your school?

10. Please any other information you deem fit to give the success of this write up is highly welcomed.

Federal University of Technology Minna.

Dept. of Maths /Computer Science

11th June, 2003.

QUESTIONARE FOR THE STUDENTS

In partial fulfillment for the award of Post Graduate Diploma in Computer Science of the Federal University of Technology Minna, the following questionnaires were designed to gather information concerning computer education in Government Secondary School Minna viz – aviz its effective teaching. The success of the project relies on how accurately and honestly questions were answered.

Could you please supply correct information by filling in these questionnaires? Any information you kindly supplies will be treated as confidential and will be restricted to the purpose of this research.

1.   In what class are you?

2.   Have you ever heard of computer?

3.   If yes, where?

4.   What do you think computers can do?

5.   Do you like to use computer?

6.   What work do you think computers can do in your school.

7.   What surprising information do you hear from those using computers?

8.   Have you enough teachers to teach computer in your school?

9.   How many times do you go for computer practical class a week?

Federal University of Technology

Minna.

Department of Maths / Computer Science

13th June, 2003.

Sir,

SCHEDULE OF INTERVIEW WITH THE PRINCIPAL OF GOVERNMENT

SECONDARY SCHOOL MINNA

Good day sir, I am by name Abubakar N. Usman a post graduate student in the department of Mathematics/Computer Science from Federal University of Technology Minna. I am writing a project on relevance of computer in post primary schools taking your school as the case study.

Sir, may I know when the school started computer education.

Mr. Principal Sir, who were the initiators of this laudable achievement i.e. the introduction of computer education in your school?

Sir, have you qualified staff to handle the subject?

Sir, in what ways do you encourage your staff in terms of furthering their studies in the field of computer science?

Do you have government backing at all?

Have you received any donation like computer set or money to purchase computer(s) from any organisation?

Could you briefly assess the performance of your students in computer science?

Finally Sir, how would you improve the learning and teaching of computer science in your school. What achievement (s) accrued since you started computer education in the school.

Thank you very much and bye for now.

3.1 NEED FOR PROGRAMING LANGUAGES

Computers today are powerful and versatile and touch our lives at many points. There is a great tendency to forget that the computer(s) is/are nothing but a machine. It can represent and store and manipulate millions of pieces of data – which can be numbers, graphics or text. But the machine doesn't have reasoning power to guide it through these functions. It doesn't have so much as the instinctual drives of the humblest living things. The computer has to be told, "Now work with numbers, Now work with graphics. Now work with text".

How is a machine told what to do? In the covered wagon days of the electronic computer (nearly half a century ago), computers were not told what to do. A computer was built to do certain kinds of calculations, and it couldn't do any other. When those calculations were finished, the computer was rewired to do another set of calculations. The computer got its instruction from its hardware (its wiring), and it got new instruction only from new wiring. This sounds as if computer users had to be scientists or engineers.

Nowadays the computer user may be a five year old or anyone else in our society who will spend a few hours leaning the computers instruction set.

But if computer technology is dramatically better today, the basic idea is the same. The computer is still a logic machine. It still does all its work with long strings of true or false statements, represented electrically as on or off, or in binary numbers as 1 or 0. The computer is a general purpose machine, but still needs to be reconfigured before it can turn from one job to another from graphics images to words to numbers and back again.

Computers are reconfigured every second of every day, but not one wire has to be shifted. Instead, the computer is equipped with a programming language, which is a set of codes and rules for giving instructions to a computer.

TWO PROGRAMMING LANGUAGES

For one example, a programming language called logo lets young children draw computer spirals and other figures by commanding a marker called a turtle to move up, down, across, and around the computer screen and to leave its electronic foot prints behind. The child controls the turtle's movements through a tiny vocabulary of English instructions (forward, back, right, left, repeat) and commands it to leave or not leave its foot prints by typing pen down or pen up as seen on page 24. For example, a grand mother who runs her own business can keep track of her accounts and plan the future course of the business by using the plain English (or plain arithmetic) commands and rules of a spreadsheet language like visi calc or Multiplan. The spread sheets here are those electronic cousins of the paper worksheets, or ledger sheets, used in double-entry accounting.

Electronic spread sheets are so easy to use that few of their millions of users perceive them as languages. But the case can be made that they are programming language. As a matter of fact the spread sheet languages are exceptionally easy to use because they reconfigure the computer more radically than other languages do.

In fact to tell the computer to do or perform a task, there must be a language to do the telling. Such languages are called programming. Computer can not be used without giving it instructions that is programming it. In short programming skills form the backbone of computer literacy. Every computer language has loyal followers who say it is better than the rest. Such partisan debates obscure an important truth; most computer languages are far more alike than they are different

A Logo turtle draws patterns on the floor while its instructor ponders new programs for it. (© Dan McCoy/ Rainbow)

from one another. The main ideas of programming can be learned in any of the common languages. Learning these ideas in one language makes it very easy to learn another language. People who work with computers often know two or three programming languages. Although computers ultimately work in binary code, it would be tedious in the extreme if humans had instructed them in this way. At a fundamental level people can instruct the computer in binary, and this is called machine code. However, a more convenient way replace the binary code by easy – to – remember instructions which is called assembly language. Assembly language makes use of mnemonics (aids to the memory), where, MUL, for example, might be part of the instruction to multiply two numbers together. Both the machine code and assembly language methods of programming are known as low level language programming, because they are intimately tied up with operating the machine at a very low level.

The other type of language programming is high level languages. These high-level languages are far removed from the detailed ways in which the machine operates, and are closer to English like instructions and the ways in which humans like to think. Examples would be languages like BASIC, Pascal, Prolog or FORTRAN 90. Such language can be split up into two major different methodologies called imperative language and declarative languages. Imperative languages typify the type in which the programmer gives the computer a set of instructions (called imperatives) which explain exactly how to achieve a result, whereas declarative languages typify giving the computer declarations in which the user has not had to state explicitly how to end result is to be archived.

Summarily, to use computer there is much need to be able to communicate with it. Computer has to be told, what to do and must understand the messages that

come back from the computer. In short there is a need to know a language. The language the computer uses has a value. It is called BASIC, which stands for Beginners All – Purpose Symbolic Instruction Code. Basic was invented in 1963 by John Kerney and Thomas Kurtz to teach students how to use a computer.

Today more people know BASIC than any other computer languages. BASIC is used in homes, businesses, science labs and schools.

Apple soft is the version of Basic mostly used. There are other versions of Basic, but their main parts are very much alike. There are other computer languages such as FORTRAN, COBOL, PL/I, LOGO, PASCAL AND Ada. Most people who work with computers know three or four computer languages.

3.2 INPUT DEVICES

There are many ways of feeding information into the computer and this is done using input devices.

There are many different input devices:

KEYBOARD

A keyboard consists of input keys. In the UK computer keyboards are based on the standard typewriter lay out QWERTY. They have additional keys such as function keys programmed to perform frequently used task, arrow keys, the control (Ctrl) key used in conjunction with other keys to perform specific task and often keys used for power saving. Input occurs when the computer user types on the keyboard. As shown in the figure A1 page 30.

MOUSE

The mouse is a pointing device that enables one to interact with (e.g select and move) items on the screen. The mouse's movements are tracked by a rotating ball and sensors in its base. When mouse is moved on the desk, the mouse pointer

moves on the screen in the same direction. The mouse pointer changes depending on where it is and what it is doing, mouse have buttons that can be used to select and choose options as shown in the figure A2 page 31.

TRACK BALL

A track ball operates in a similar way to a mouse but is a stationary unit. Unlike a mouse, it has the rotating ball on top instead of underneath and is manipulated with the figures or palm of the head. Trackballs are commonly integrated on laptop computers since they are easier to operate in limited spaces. A finger is placed on the pad and movement of the finger causes the pointer to move on the screen in the direction of motion. This can be seen in the figure below.

TOUCH PAD

A touch pad is another alternative to a mouse in that it is a device for interacting with a computer screen. A touch pad is also common on laptop computer for the same reasons as the trackball. It is a flat pad that works by sensing finger movements and downward pressure. This can be seen in the figure A3 page 32.

SCANNER

A scanner can convert physical printed text or images into electrical signals the computer can understand. Scanners can be flatbed/which can scan a whole page of text or images at a time, or handheld.

A more typical scanner would be a flat bed scanner capable of working with an A4 document as shown in figure A5 on page 34.

LIGHT PEN

This is a light sensitive detector in the shape of a pen. It enables the user to draw and change pictures by moving the pen across the screen. It is normally used unspecialized applications only.

The idea is shown in the figure A4 on page 33.

JOY STICK

A joystick is able to interact with a computer program (e.g control the movement of a shape on the screen). It has a stick that moves to affect corresponding movement on screen. Joy sticks are usually used with games.

3.3 OUTPUT DEVICES

There are many ways of getting information out of the computer, some common output devices includes the following:

MONITOR

A monitor is the name given to any device that displays information on a screen (soft copy) and is normally separated from other parts of the computer. Laptop computers do not have separate monitors because the display is integrated into one unit. Monitors can be monochrome or colour. A VGA Monitor can display up to 256 colours at one time and has a maximum definition of 640 x 480 pixels (a pixel is an abbreviation for picture element, the tiny dots on – screen that form an image). A super VGA (SVGA) monitor is higher definition with 800 x 600 pixels.

Desktop monitors tend to have cathode ray tube (CRT as used in TVs) technology. Laptops generally have LCDs (liquid crystal displays) because they are lighter, use less power and less space. However, screen is more correctly called a monitor.

VISUAL DISPLAY UNIT (VDU)

This is another device that displays computer output on a screen. It is very similar to a monitor except that it is usually associated with a keyboard and often used as a terminal to a mainframe computer.

SCREEN

A screen is the display area of a monitor.

PRINTERS

Printer provides printed (hard copy) output. There are three commonly used types of printer: dot matrice, inkjet and laser.

The dot matrix printer is a low cost printer but it is being superseded by newer technologies. It is an impact printer and produces its characters from patterns of individual dots striking the paper via a ribbon (usually) a line at a time. Dot matrix printers are noisy in operation and the print quality is not particularly good but they are cheap to run. It is also called serial printer and shown in figure X a typical modern dot matrix printer.

Both inkjets and lasers are quiet in operation and print to a higher quality. They are both non impact printers. The inkjet sprays ink on to the paper from an ink cartridge. Laser printers use laser beans reflected from a mirror to attract ink (called toner) to select paper areas as the paper is fed over a drum. Laser printers are generally quicker and produce the highest output. All types have moderns available to print in black and white and/or colour.

Printers come with a recommendation for type of paper since the quality of paper used has an effect on the quality of output produced. The resolution (clarity) of the print out is usually measured in dots per inch (dpi). The Epson laser printer (EPL – 5800) has a resolution of 1,200 dpi and a speed of 10 pages per minute. Printers

Screen for output

Processor

Keyboard for input
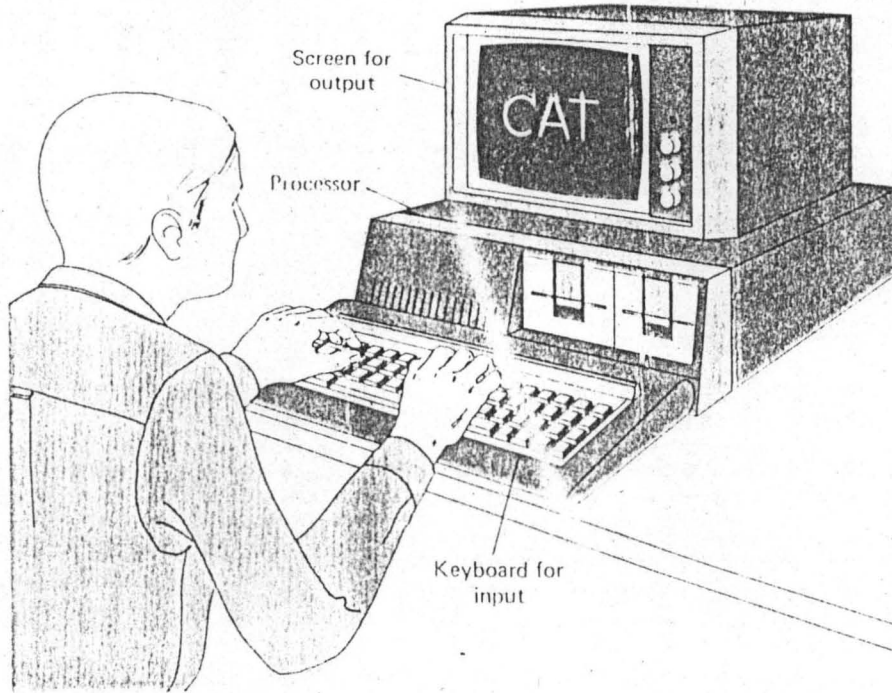
...urs when the computer
...s on the keyboard; output
...hen the processor sends
...n to the screen for the
...ad.

...URE A I
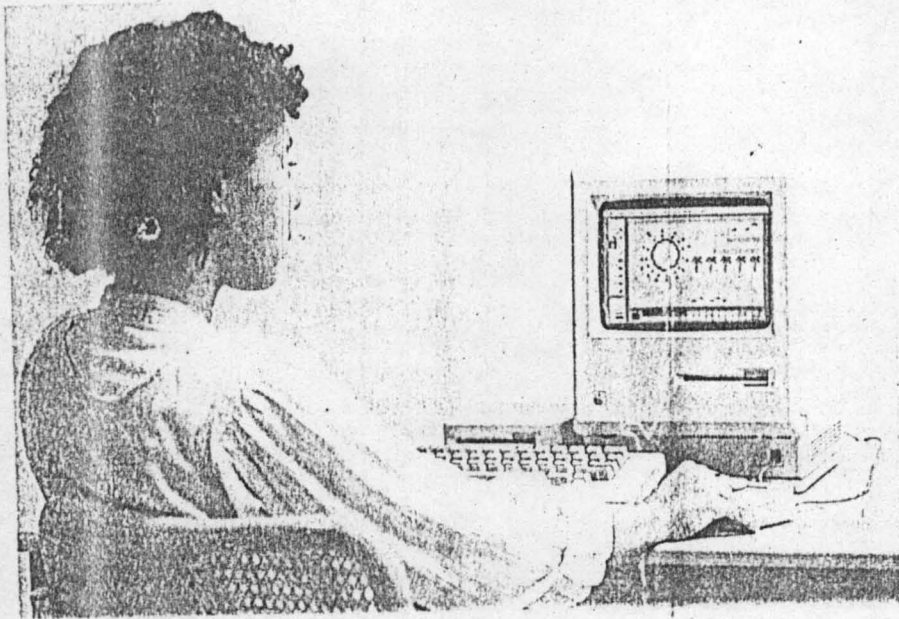
A mouse allows the user to move the on-screen cursor quickly and accurately to any point on the screen, and its push button can control many kinds of text and graphics functions. (© *John Lei / Omni-Photo Communications*)

FIGURE A 2
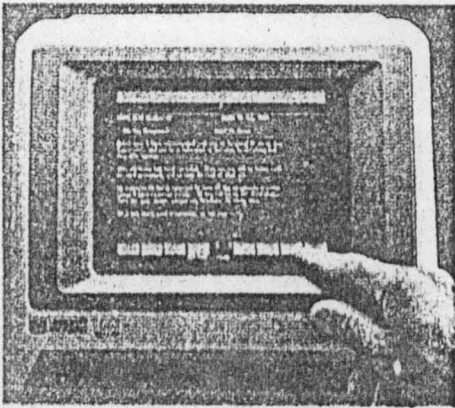
A touch screen, responding to input
from the computer user's finger.
(Courtesy Hewlett-Packard)

FIGURE 3
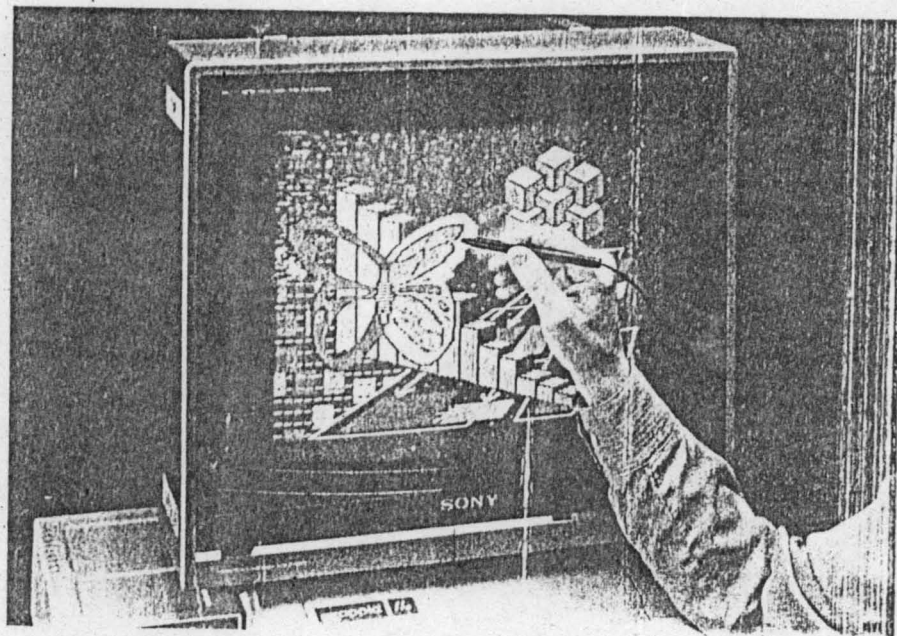
A light pen being used for direct on-screen drawing. (*Courtesy Koala Technologies Corp.*)

FIGURE A 4

(a)

Document being scanned

FIGURE 5

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range greatly in price depending on the quality of output required and speed of print. Most printers have a local memory in order to speed up the print process.

PLOTTER

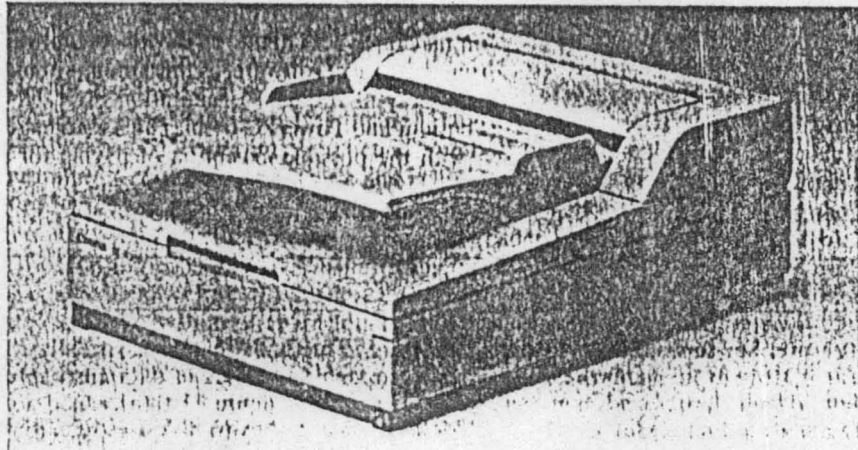A plotter uses pen to produce drawings. The computer gives the instructions so the plotter knows which pen to use and where to draw. Plotters are normally used in engineering applications. The major advantages of the graphics output produced on plotters over the graphics produced on devices such as dot matrix printers are:

1.	Continuous lines, the thickness limited only by the pen.

2.	Hundreds of colours posited, limited only by the ink.

SPEAKERS

Speakers produce output in audio format. They are used in music, games and speech.

SPEECH SYNTHESISERS

Speech synthesizers run text into spoken words and vice versa. They can be used by the visually impaired. There are also VR (virtual Reality) helmets normally worn over the head which project images into the eyes by using small computer screens extremely close to the eyes, it is therefore basically a bead-mounted CRT display.

RESPONSES FORM STUDENTS:-

Going through the responses from the students, one can rightly conclude that most of them knew and saw computer for the first time in the school. It is worthy of mentioning that majority of students interviewed love using computers. Many of them were able to tell the application of computers in the school such as for writing out results, viewing of places in the world even their own village once connected to

internet. According to students, enough teachers are available to some extent to teach them. A computer practical class is once in a week per each class.

RESPONSES FROM STAFF

After administering the questionnaires for the staff, the following results or findings were reached. Most of the staff interviewed cut across many subject areas with almost all of then being computer literate. Some of staff interviewed have being in the school for the past twelve years.

In selecting students for computer class, the following yardsticks are normally put into consideration.

1.   **INTEREST**: In the first place the student must show sign of interest before registering him for computer class. This implies that interest is the paramount factor considered first before registering any student to register for computer science in the school.

Regardless of the students academic performance, interest of the student must be the basis of green light for selection.

2.   **ACADEMIC PERFORMANCE**:   Academic performance is the second key factor considered for selecting students for computer science. Academic performance of such students must be above average. This implies that students must be academically fit before he could be considered to take computer science in addition to other subjects he is offering. There is no compulsion in selecting students to read computer science as a subject in the school. Selection is purely based on interest and academic performance of students.

Moreover, selection is normally done in senior class i.e. from S.S 1 to 3.

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From the comment of staff, there is an argent need for the school to purchase more computers and software to assist in teaching students. Both system software and application software be purchased to run the computers for teaching students. The school averagely has a period per week for computer science class in all the S.S Classes. There is a need as observed by the staff for the purchase of more computers and training and retraining of resource persons. I.e. computer teachers to handle the subject as a way of improving the teaching of computer science in the school. This implies that more qualified or resource persons be employed for the school for proper teaching of the subject.

Adequate funding should be made available to the department of computer science. That is to say the department of computer science in the school should be adequately funded in order to enhance its effective teaching and development.

In conclusion, I made several efforts to meet the principal of the school for the interview but all in vain. This could be attributed to his tight schedule of duty in the school. The last time I called at his office, I was reliably informed that he has traveled out of the country.

CHAPTER FOUR

4.0   COMPUTERS IN EVERY DAY LIFE

4.1   SOFTWARE DEVELOPMENT

As well as the increasing sophistication of the hardware, a most significant development was made by Von Neumann in 1945. This was the idea that the program as well as the data should be stored inside the computer. This has led to the idea of the stored program concept that is still in use in machines today. Before the stored program concept was introduced, it was a massive task to program the computer do many different things.

However, after this concept was introduced, a great leap forward in the versatility of computers was attained. The first computer to run a stored program was in fact the Manchester MKI, developed at Manchester University. Also during the late 1940s many developments in software were taking place. In particular the Cambridge University Computer EDSAC (Electronic Delay Storage Automatic Computer) and later in America EDVAC (Electronic Discrete variable Automatic Computer) were significant developments which worked on the modern idea of the stored program concept. In the commercial and business environment great strides were being made and LEO (the Lyons Electronic Office) was a milestone when, in 1953, it became the first computer to be used for commercial purposes. During the early 1950s another significant development took place when the Univac Company developed a computer system which paved the way for the layout of present day computers.

Hitherto all computer had a unique layout which made them difficult to use by all but the most specialized engineers and scientists.

TYPES OF SOFTWARE

There are two main categories of software, system software and application software. System software includes the control programs, such as the operating system. Application software is any program that processes information for the user (e.g. word processor, speed sheet, pay roll).

OPERATING SYSTEM SOFTWARE

The operating system (OS) is the software that controls the hardware and runs the programs. It is the first program run when the computer is turned on. Common operating systems include Ms-Dos, Windows. Linux, Mac OS and UNIX. Windows is an example of a graphical user interface (GUI) because it uses icons (shall pictures), menus and a mouse. These make the software more user friendly since it is intuitive and don't have to remember complicated commands. The apple Macintosh also has a graphical user interface.

APPLICATION

Common applications software includes the following:

*   Word Processing – A word processing program allows one to enter and manipulate text on screen. The text can be saved as a file and then printed. It is the most commonly used application. Once the basics have been learnt, it is easy to produce professional looking documents. These documents can be stored on disk so they can be recalled and altered at a later date. Microsoft word is a word processing program.

*   Spread sheet – This program has some aspect of filling system and some of calculator. It consists of a large area or grid, in which one enter data and text and work out sums. The program will do the calculations as instructed by the

user. When changes are made, the spread sheet automatically recalculates new value. It is very fast, accurate and flexible. Spread sheets could be saved to disk and print them also. It is used in accounting to produce budgets, balance sheets, payrolls and in scientific modeling and "what" if analyses. Microsoft Excel is a spread sheet.

* Data base – This is a program that permits data storing in an organized record format. It is sometimes known as an electronic filing system. It is structured so it can be used to retrieve, sort and search for data quickly and in many different ways. Data bases can be saved to disk and can be printed. It is much faster than using a paper database, when filling cards are stored on a manual card index system, and has a much greater storage capacity. Data bases are extensively used in all types of business and commerce. Microsoft Access is a database spread sheet.

* Payroll – There are many specialized programs available for payroll tasks. Spread sheet packages are capable enough to carry out payroll tasks for small companies.

* Presentation – presentation software allows one to create, organize and design effective presentations. These can produce over head transparencies, 35mm slides or automated presentations on the computer.
Microsoft power point is a presentation program.

* Desktop Publishing – Desktop Publishing (DTP) Software allows creating professional looking manuals and brochures. Microsoft publisher is a DTP Program.

*   Multimedia – There are many programs available to use with multimedia (i.e. combining graphics, text, sound, video and user interaction). Paint shop pro (image manipulation) and programs for music generation are popular.

SYSTEM DEVELOPMENT

Computer systems development employs a number of specialized staff (e.g system analysts, programmers), who work together at different storages. It has a life cycle as shown below.

Research analysis and design: - This includes a feasibility study, the overall general design, prototyping, the detail design and the functionality requirement specifications.

Programming: - This includes the design and coding of the system.

Testing: - The system then needs to be tested to ensure it will perform correctly.

Implementation: - This includes training of staff, converting from the old system and installation of the new one.

User Acceptance: - The user will accept the system once it has been fully implemented and tested.

4.2. COMPUTERS IN DAILY LIFE

The computer is reshaping our world and it will go on reshaping it. It is also more deeply involved in the texture of our lives than any other dominant technology ever was. In fact computers are everywhere. Some common places they are used include the following:

*   Doctors Surgeries, where patient records are computerized. In a book (computers and the information society) written by James Radlow, was reported that a computer magazine published a letter from a California doctor describing how his

computer had helped him save a life. The hospital called him late one night to tell him a post surgical patient in the intensive care unit was bleeding, and standard procedure had failed to stop it. The patient had already shown a tendency to such bleeding, and according to the current medical literature this tendency made the bleeding difficult to control. The doctor had a standard brand micro computer in his home. It was connected to a computerized information source tailored to meet the needs of physician. He sat down at his computer, called up MEDLINE on the screen, and search through the literature concerning his patient's specific bleeding problem. He found references to nineteen separate journal articles for each one displayed on his computer screen. Just one of the nineteen (An English Language Abstract of a German Article) described bleeding causes and symptoms matching his patients case. The abstract also described a new blood replacement treatment. The doctor called the hospital and gets the patient started on the new blood – replacement therapy. When he visited his patient in the morning, he found that the bleeding had stopped. The doctor was convinced the computer helped to save his patients life, and that the computer age is here to stay. No one could dispute either statement. Also they are being used in hospitals to take medical histories. This saves doctors and nurses valuable time.

The patient would probably have died if the doctor could not obtain the information necessary to save the patients life or could not obtain it fast enough. Computers are also used in waiting rooms to educate patients on matters of general health.

Here the computer serves as a supplement to the pamphlets meant for people to read while waiting to see the doctor. It has advantage of being more interesting, and the information thus acquired is more likely to be retained. It is also used to
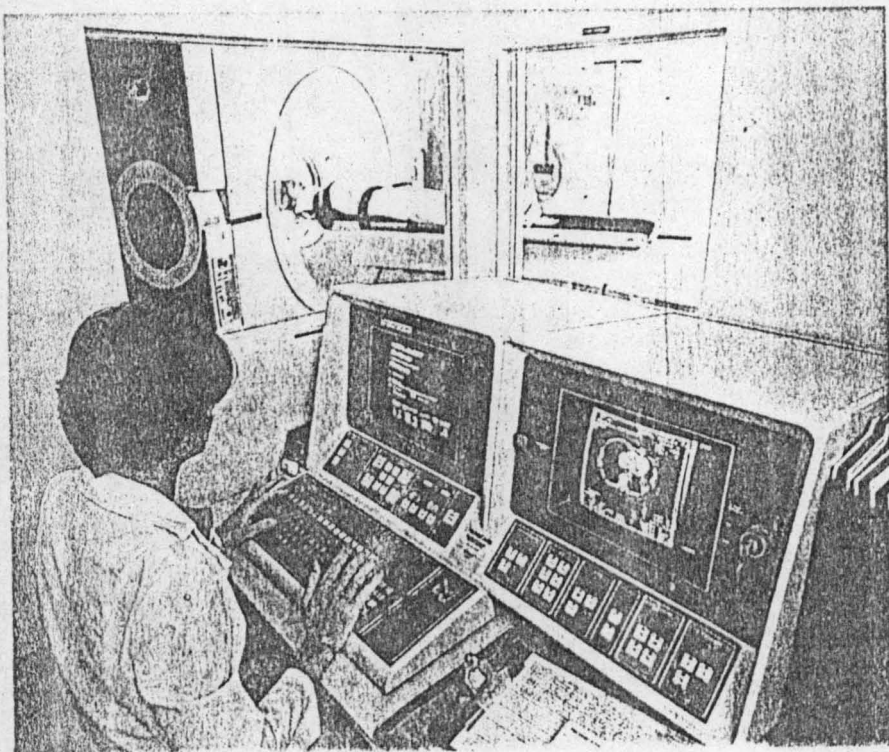
A CAT scanner at work; the cross section of the patient seen on the right-hand screen is assembled by the computer from thousands of separate x-rays. (© Larry Mulvehill/ Photo Researchers)

FIGURE B

4.3

monitor post surgical and critical ill patients in intensive car units. The patient is connected to computer monitored sensing devices which can instantly detect any dangerous abnormality in body functions, such as a sharp rise or fall temperature or pulse rate. If the patient's condition warrants immediate attention, the system flashes a signal which summons a doctor or nurse. Such systems are the equivalent of a private nurse on duty 24 hours per day. Computer monitoring is also used in the birthing rooms of many hospitals, in reading electrocardiograms (EKGs). This test for heart abnormalities can be given in a few minutes. Another example of computer aided diagnosis is computerized axial tomography, or CAT Scanning. The cat scanner is an imposing, futuristic – looking device used primarily to determine whether a patient has had a stroke and if so, what area of the brain has been affected. The computer is useful also in medical research.

Work on cancer, heart disease, stroke, drug addition, muscular dystrophy, and innumerable other medical problems progresses much more rapidly now that the statistical and laboratory data can be processed quickly and accurately through computers.

SUPER MARKETS:

Super markets where bar codes are scanned and product and (sometimes) customer information is stored. This is known as electronic point of scale (EPOs). Using such methods stock levels can be managed. Product bank cards are swiped and payment is taken directly for goods. This is termed electronic funds transfer at point of sale (EFTPOs).

One man or woman armed with a micro computer and a multifaceted accounting program, can maintain customer, employee, and vendor files, keep

individual financial records for a hundred different departments of a company, handle general ledger operations receivables, and do much else as well.

BANKS/BUILDING SOCIETY

Banks/building. society cash machines (known as automated teller machines or (ATMs) where cards are used to identify the customer by reading the magnetic stripe and checking the user's PIN (PERSONAL IDENTIFICATION NUMBERS)

LIBRARIES

Libraries where books are kept track of using data base facilities and books are scanned when taken out and returned.

4.3   COMPUTERS IN THE HOME

One might be forgiven for thinking that the home computer revolution experienced in the 1980s has come and gone. The introduction of very cheap micros certain had an impact. In reality the public were initially impressed. However, the likelihood of a computer in every home now seams a remote prospect in the eyes of most of the public. Most people have little perception of the impact of the next generation of computers, broadcasting and communication systems. Never the less an increasing number of households now have a computer many with internet access. It is used for various activities by all family members including:

*   Working from home (teleworking)

*   Sending e-mails

*   Accessing the internet to find information for various activities (e.g. homework, projects, lobbies).

*   Keeping house hold amounts and income submissions.

*   Shopping, banking, booking tickets.

*   Player games.

The biggest advantage of the new TV systems will be the two way communication processes. One no longer has to be a passive observer of what is being transmitted to the box. Via cable, satellite, audio, video all can be processed. This allows one to send back messages to central computers linked to retail outlets, for example a variety of goods can be ordered for instantly. Quoting a credit card number, perhaps a PIN (personal information number), answer a few questions and with a few hours the goods are being dispatched home.

Many people's lives revolve around what's being broadcast on the television, and so this, like the introduction of the video recorder before it may further revolutionise the way that many people organize their lives in the future.

4.4 <u>COMPUTERS AT WORK OR IN EDUCATION</u>

Computers have been used in education for years, but until the 1980s that use was largely confined to colleges and universities, where computer science is a well established field.

With the coming of inexpensive micro computer.
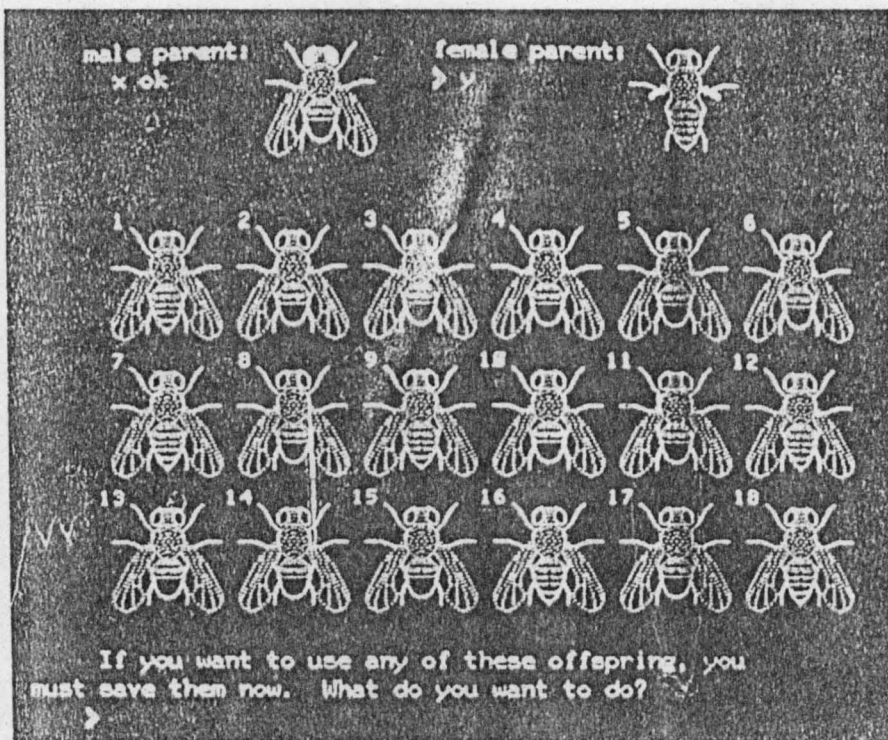
However, a trend has become a tidal wave.

The computer is well adapted to the sort of drill work that is an indispensable part of traditional education. Fitted with a program to drill the student in spelling, vocabulary, or arithmetic. It is an endlessly patient tutor it will point out mistakes and repeat the drill, or it will go on the next question if the answers are correct. Students can take change of their own learning, proceeding at their own pace. At the computer console there is complete privacy. A pupil who happens to be slow at learning the material is not further hampered by fear of embarrassment or of holding up the rest of the class at large profits in another way: the computer enables him or her to go ahead with more advanced work.

The computer is also ideal for immersing a child in the "great works" of the Montessori Method. Central to this educational theory propounded by Mari Montessori is the concept of a task which holds the child's entire attention, to the exclusion of whatever is going on nearby. It is by a succession of such "great work" Montessori said, that the child's mind shapes itself. Computers are useful in the teaching of laboratory science. Given the physical details and innumerable calculations that go into a laboratory experiment, the student of physics or chemistry or zoology can easily lose sight of the underlying principles that are to be illustrated. It is extremely helpful to see a computer simulation of an experiment, which cuts through the details and calculations, before going to the laboratory to see how it all works with real substances.

In some cases, the computer simulation must substitute for the laboratory work. For instance, there just isn't enough time to carry out a genetic experiment on several generations of fruit flies. But given the necessary data, a computer can quickly come up with the statistics and the accompanying graphic images for such an experiment. And the simulation may have at least as much educational value as the actual experiment as shown on page 48.

In the same way, the student can carry through, on the lengthy, expensive, or other wise impartibly experiments in physics, chemistry, and the social sciences. Such simulations, as well as drill – and – practice tutorials, are available to schools through computer – assisted instruction (CAI) networks.

The oldest, best known, and most widely used of these networks is the system called PLATO (Programme Logic for Automatic Teaching Operations). PLATO has programs designed for students at all levels. The computer in the school is not only a way of implementing the existing curriculum. It can drill students on the

male parent:
x,ok

female parent:
> y

1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17 18

If you want to use any of these offspring, you must save them now. What do you want to do?
>

A computer-generated genetics experiment can show the probable outcome of generations of fruit fly interbreeding in a matter of minutes (*Courtesy Data Control*)

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facts and figures they have to know. It can usefully simulate scientific or social – scientific experiments. And in the process of being used by school children for these purposes, it teaches them about itself. In a well runs school with creative educational aims, the computer can function as a teaching assistant. It can free the teacher to do what teachers are supposed to do – interact with students in the learning process, help them discover the world, help them stretch their minds.

From the above, it can be seen that business, industry and educational establishments have a great need for computers since they have a great deal of data that needs calculating and analyzing. They may have special systems known as INS (Information Management Systems). Or DMS (Data Base Management System) Even the smallest office has now come to rely on computers. However in some situations, personal skills cannot be replaced such as in the caring professions e.g. nursing and counseling and any where innovation, thinking and communication are vital).

The following are also typical computer uses.

* keeping databases of names and addresses (database application).

* Account information (spread sheet and database applications).

* Stock control and sales analysis (spread sheet and database applications).

* marketing, including advertising and selling via their websites (using e-mail and the internet and web browser software).

* Pay roll (using spread sheet or customized software) and electronic funds transfer (EFT), i.e moving money from one account to another (e.g. wages).

* Computer-based instruction has helped greatly in the teaching of spelling, English composition, whether facts, and arithmetic skills.

* Student grades and projects mark (using data-base and spread sheet applications and other specialized software for projects, (e.g. drawing software for art and design language software).

* Computer based training (CBT). Many specialized software packages are now available to assist with all types of training and for all age groups. People can work at their own pace.

* Traffic lights, which have sensors to detect traffic and which send messages to a controlling computer that regulated traffic flow.

* Producing all paperwork; letters, memos, brochures, e.t.c using word processing (word processing, D.T.P. and integrated office suites).

IT AND SOCIETY

Information technology and computers

Information technology (I.T) is term commonly used to cover the range of computer and telecommunications technologies involved in the transfer and processing of information. There has always been a need for accurate up-to-date information, even before the advent of computer technologies, but it used to be a time-consuming process to gather and process relevant information. The advent of very large mainframe computers, relying on specialized staff to operate them, brought a change in the ways big business handled information. Increasingly over the past decades, as the cost and size of computers have decreased, many tasks are now undertaken by powerful, inexpensive desktop PCS on a vast scale. Linking these computers together via the internet has resulted in an explosion in the amount of data being manipulated everyday. Today, almost all aspects of every day life rely on information technology and this has generated an ever-increasing demand for IT skills.

The society we live in today relies on computers to enable us to gather and disseminate information quickly and easily. Because of this it has become known as the information society. Some people feel unease about so much reliance on computers and wonder where it is leading us some people feel threatened by it, other feel empowered by it. In situations where computers are being used it is worth asking; is this job for a computer or would a human interface be better? Some times there are no clear-out answers and much depends upon general views.

Few, if any, workers remain unaffected in some way or other by the introduction of information technology. Information technology has Permitted its way into helping with decision making at the highest levels of management, in helping to increase office efficiency by several orders of magnitude. Electronic type writers, and increasingly sophisticated word processors in some industries, especially those which make use of large chunks of standard tent such as the legal professions, for example, have now made a single employee as productive as about 10 to 15 old-style employees with their mechanical machines. Work carried out by many people in the typing pool can now be handed by a hand-full of trained word processor operatives.

Information super highway which is another name given to the internet-the telecommunications infrastructure that allows access to a never-ending source of information across the world. It is changing the way we live and work at ever increasing rate. Only our imagination can limit its usefulness.

YEAR 2000 ISSUE

This issue affected computers that only used '00' and not '1900' in the year field, so 1998 was 88 and 1996 96 and so on. With memory being in short supply with some of the earlier computers, it had seemed prudent to try to save two Bytes

(the first two digits of the year). There were fears that the computer would understand year '00' as being '1900' and not 2000.

Programmers needed to work on systems before the year 2000 arrived so that computers were not affected. Although the year 2000 bug created few problems there were predictions that it would have been much worse.

ELECTRONIC COMMERCE

Electronic Commerce (e-commerce) means doing business on-line. If you advertise a service or product, order a book, your groceries or arranging holiday using the internet, you are participating in e-commerce.

A GOOD WORKSPACE

Computer should be used in a comfortable positive otherwise one may become easily fatigued, or injured. Repetitive strain injury (R.S.I), an injury arising from making upward movements or the prolonged use of particular muscles, is a recognized condition. It can affect the hands, neck, back and eyes due to incorrect computer use. Hence the following guidelines should be followed or adhered to.

POSITIONING OF THE SCREEN

All screens should be adjustable so it can set them up for once requirements and muscle strain in the neck and shoulders be avoided. The screen should be directly in front roughly at arm's length. The top of the screen display should be above eye level.

POSITIONING OF DOCUMENTS

To prevent visual fatigue and muscle tension and to minimize re-focusing and twisting the neck, these should be near to the screen at the same height and distance.

POSITIONING OF THE KEY BOARD

If the Key Board is not comfortable (i.e. it is placed too near the edge of the desk so there is no where to rest wrists), it could put unnecessary strain on the wrists causing repetitive stain injury (R.S.I).

TYPE OF CHAIR

An adjustable chair is essential. The back should be straight and feet should rest on the floor. The forearms should be roughly horizontal when using the Key Board.

LIGHTING

Screen glare should be avoided by adjusting back ground lighting and using windows blinds or positioning the screen so it, is unaffected. Anti-glare fitters are now available.

VENTILATION

Adequate ventilated working areas should be provided.

FREDUENY BREAKS

It is important to take frequent breaks and to rest eyes by focusing them in the distance and working around.

There is legislation administered by the Health and safety Executive, covering computing environment. Some of the issues have been covered fully in chapter five. It is also important to ensure that equipment is safe. Power cables should be secured so they cannot be tripped over and power sockets should not be overloaded.

CHAPTER FIVE

5.0. SECURITY, COPYRIGHT AND THE LAW

5.1. SECURITY

By data security we mean the protector of data against unauthorized discloser modification, or destruction. By privacy we mean the individuals right to share or not to share information with others. Since data banks often hold personal information, it's natural to think that security and privacy are linked. To an extent they are security measures protect data whose disclosure or modification would invade individual privacy. There are two different aspects of security to consider; the physical security of the data; the disks on which it is stored etc, and the prevention of unauthorized access. If one of the disks containing the data base becomes corrupted then there should be facilities to recover the data base so that a minimum of information is lost. Typical back ups might be made daily, weekly, monthly or at intervals which particularly suit the organization and data base. There is also data base management system use to prevent illegal access to the data by unauthorized users or hackers. For security reasons, it is always a good idea to provide a backup (extact copies) of data (data is the information put into the computer on a regular basis. Then if any thing goes wrong with the computer or the data becomes corrupted, (damaged) it will be able to revert to the safely stored version. Various backups in a safe and separate place away from the computer. If there is a power cut when using computer, the documents and information that have not been stored to disk will be lost. It is important to save work regularly so as to minimize the amount of effort required to redo the work in such situation.

Some times the computer may just crash (i.e. cease to function) either because there is a program error or a move serious system problem. If it is a program problem, restart the program. If it is a system problem restart the computer by pressing the Keys Ctrl, Alt and Delete at the same time.

If this doesn't have any effect, turn the computer off and then restart it. This means recovering from errors if a disk gets corrupted, or making sure that most of the data can be restored in the event of a fire etc. If one of the disks containing the data base as explained above, then there should be facilities to recover the data base. The amount of information lost will depend on the frequency with which the data base is backed up. This will in term depend on the vitality of the data contained in it. The backup data should be preferably stored in a fire proof container in a different building. It is note mentioning that disks or tapes etc could be literally be stolen from the room in which they are stored.

Therefore, the room should be locked and the personnel who are allowed access to the main computer room, or access to the micro containing the database must have high level of security. Computers can be pass word protected so that the user only can access the data on them. In some organizations several passwords are needed to access strictly confidential data, giving added extra security. Document files can also be password protected. It is always good practice to use a password that is not easy for anyone to guess and it must not be divulged to anyone. Data can also be encrypted (i.e. turned into a special sort of code). A key to this code is required to make the data readable again. Cryptography is a study of the techniques for keeping data secret. Although the security levels sound like the temperature settings on an oven, their use is quite simple. One is only able to do things to the data that has been allowed by ones level of security.

Every action such as reading, updating and delection, etc, can have different security levels assigned to them on a data in a particular field. Therefore, one can usually specify which fields are visible or invisible to a particular user, and what type of access the user can have on each file. This information can then be used by the system in a form of lookup table when requests are made by the different users.

Database have to have sophisticated levels of security as many different people can have access to the same database. One would not for example, want the catering manager to have access to every body's salary information. However, they may well have a high security level on a field which relates to the restaurant bill for the month.

The amount of money in this field might well be related to the salary field by showing up as a debit from the salary cheque.

5.2. <u>COMPUTER VIRUSES</u>

A Computer virus is a destructive program buried within an existing program, that is to say a computer virus is an illegal program which usually propagates itself and modifies or destroys other programs. At best it can cause annoying messages to be displayed on the screen, and at worst it can ruin a business through massive losses of essential data. People with programming skills intending to cause disruption and damage to computer systems write them. There are hundreds of known computer viruses, with some of the most common having names like Michelangelo, the Trojan horse and the worm, for example.

The Michelangelo virus is a particular example of one type of virus called a logic Bomb or a time bomb. This is a disastrous virus which usually wipes data off disk on some pre-determinate date. This is often Friday the 13th, or in this particular case March 6th which happens to be the great artist's birthday. The Trojan house

is an example of a virus which appears to do something legitimate but at the same time actually does something illegal. For example, whilst generating some data for transfer to a disk, an illegal copy of the data can be made and placed in an authorized place. This illegal copy could then be used at a later date for black mail or other extortion purposes. The worm is an example of a virus that replicates itself and takes over computer memory. Therefore, software that would normally run with no problems at all on a particular computer eventually won't be able to run properly because of lack of memory due to multiple infections of the same once the infected program is run, the virus coding is activated and attaches copies of itself to other programs. Infected programs copy the virus to other programs. In this way it can quickly spread causing several damage to computers and networks. A virus cannot attach itself to data. Many viruses cause error messages to be generated which apparently come from the operating system. Therefore users spend some time trying to rectify errors which don't actually exist. Others link to applications and then cause these applications to fail to run on certain days (a non destructive but equally annoying variation on the Michelangelo virus theme). A virus will often load itself into an illegal area of memory and thus cause the computer to crash. Others might do something as simple as change an ASCII code from one value to another, thus causing errors in certain documents or even worse, in the source code of some programs or applications. Some viruses attempt to protect themselves in particularly nasty ways. For example, in an attempt to delete some types of virus, it can activate a logic bomb or time bomb effect, thus causing more damage than the original manifestation.

It is therefore advisable that on working with or on stand – alone computers (i.e. no network connections), there should be no sharing of data with other

colleagues or friends. Both public domain software or share ware should not be used. There is a need to buy only legal original copies of software from Bona fide suppliers. Unfortunately, in the real work, people do have to share data, illegal or pirated software is used, shared databases are often accessed over local and international networks, and workers with malicious attitudes do deliberately infect systems with viruses, therefore, there will always be a need for protection software. Millions of naira is lost through various types of computer use yearly. It is not surprising, therefore, to find that enhanced security measures are needed at almost every stage of the proceedings from the guard at the factory gate through to the screening of employers before granting them a position with the company.

Simply put to protect against viruses, always know the source of software. When down loading software from the internet always save it and virus check it before running it. Also be wary when opening e-mails. The I love you virus affected 10% of business computer system in the UK alone and many more throughout the world in May 2000, costing millions of pounds. It was spread via e-mail. The reason the virus spread so quickly was because when one clicked on the e-mail attachment, it opened address book and was then e-mail to every one in the address book. Anti-virus utilities are available and are a good 'insurance' investment.

To have a virus on computer – close down the computer and restart it using a write protected floppy boot disk and then run a virus utility. It's obviously far more efficient not to get infected with a virus in the first place, and many viral – detection and viral – killer programs are available on a variety of different flat forms. Once a particular virus is known about then software can be written to detect and therefore remove it from the system. It's usual to get frequent updates of any inoculation software so that the system is protected against the latest known viruses. Most viral

protection schemes are indeed excellent, and millions of Naira has probably been saved by the appropriate use of viral-protection software – Nevertheless, no viral detection and protection scheme can guarantee protection and is therefore not a substitute for vigorous and efficient procedures to re-establish data in the event of a viral or any other type of disaster.

5.3   COPY RIGHT AND THE LAW

When a software package are bought (e.g. Ms Office there is an agreement) (a user license) with the manufacturer it's only for personal use (i.e. it will not be duplicated or leaned to someone else to use). Copying licensed software can be quite easy to do but it is illegal. It is a good way of allowing viruses to enter the system since shared resources like floppy disks and e-mail files could be infected. It is highly advisable to purchase software from reputable sources thereby knowing the software not to be pirated.

Freeware is a software one can use free of charge. Often it is given away with computer magazines or it can be down loaded from the internet.

Shareware: - shareware software can also be downloaded from the internet and is distributed with computer magazines. The idea is that, if one try it and would like to keep using it, one should register and pay for it.

5.4   DATA PROTECTION ACT

The data protection act in the UK was passed in 1984 and was updated on 1 March, 2000.

It sets rules for processing personal information on computer (and on some paper records). It gives individuals the right to know about the information held on them (exceptions being police and some times medical records). All organizations that hold computerized data on individuals must register with the data protection registrar

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as a data user, personal data is kept for many reasons (e.g. by tax offices, personnel departments, banks, hospitals).

There are eight principles to ensure information is handled properly. The data must be:

* Fairly and lawfully processed.

   The information to be obtained and personal data shall be processed fairly and lawfully.

* PROCESSED FOR LIMITED PURPOSES.

   Personal data shall be held only for one or more specified and lawful purposes.

* Adequate, relevant and not excessive.

   Personal data held for any purpose or purposes shall be adequate, relevant and not excessive in relation to that purpose or purposes.

* ACCURATE

   Personal data shall be accurate and, where necessary, kept up to date.

* Not kept longer than necessary personal data held for any purpose or purposes shall not be kept longer than necessary for that purpose or purposes.

* SECURE

   Appropriate security measures shall be taken against unauthorized access, or alteration, disclosure, or destruction of personal data and against accidental loss or destruction of personal data.

* Not transferred to countries without adequate protection. A data subject shall be entitled.

(a) At reasonable intervals and without undue delay or expense.

i.   To be informed by any data user whether he holds personal data of which that individual is the subject; and

ii   To access any such data held by the data user.

iii.   Whether appropriate, to have such data corrected or erased.

The data protection, act of 1984 just applies to data held on computer. However, it must be appreciated that the potential for the misuse of data held in computers is vast compared with the same data held in filling cabinets. Even so, this does not hold the people who have the wrong credit rating stored on a piece of paper in the bottom of a locked filing cabinet.

Another legal milestone was introduced when computer mis-use Act recently came into being. For the first time hacking and other such criminal activity became illegal. Before the advent of this popular act the only criminal offence being committed by someone who broke into a computer system was theft of electricity.

5.5 CONCLUSION

We saw the benefits of computer in the Schools in chapter four.

Computers can profitably be used wherever drill work is needed. They can also be used to make the learning process more creative and independent. They enable slow students to proceed at their own grace in privacy and without public limitation, and quick students to go ahead of the class. At every level, computers free teachers to spend more time with their students on class projects or individual assistance. Finally, they provide instruction in computer programming and the disciplines of computer language. Again, the use of computer in the schools is likely to increase as the computer Age progresses and the need for computer literacy becomes ever clearer. Some educators object to this tendency, pointing out that computer alone cannot save out decaying school system. It is certainly true that the computer in the classroom is no substitute for good teachers and that it cannot make bad school administrators should think about what and what part the computer can play in them. But given the large numbers of helpful than they see around them. Indeed, their will be far more cause for worry if government funding is not provided for computers in inner-city school. The gap between the privilege and the disadvantaged will only increase if ghetto children are denied the computer literacy and computer – aided instruction

The arrival of a home computer often brings parents and children together as they learn to make the machine work for them. (© Chuck Fishman Contact Woodfin Camp & Associates)

available to their peers in the suburbs. It is also sometimes objected that children intent upon their computers in little cubicles at school are being alienated from society – are being encouraged to be loners. With drawn from other people. But before there were computers there were books, and children and adults read them, alone and absorbed. Indeed, they still do. Does reading alienate the reader? Alienate certainly exists in our society, but its causes lie far deeper than such accusations

would imply. Computers have not caused it, and their use in the schools does not contribute in it.

If anything, the reverse is true, children who find themselves competent with the computer, as with anything else, are less with drawn than those whose experience leaves them nothing to feel competent about.

The increase competent of microcomputers in the home also may affect the course of education, and sooner rather than later. Virtually everyone complains of the deterioration in the schools system. It has driven many parents to take their children out of the public schools and educate them privately. But private schools are expensive, and often there are no good ones near by. Moreover, few parents have confidence in their ability to teach their children themselves in all the required subjects. The home computer, looked into an educational network such as PLATO, could change that. An enterprise like this summons up again, in some minds, the spectre of alienation the solitary child with electronic teacher.

Obviously provision would have to be made for interaction with other children. This would be managed by having small groups of children learning together. Such a solution to the problem inadequate school system is hardly the most

desirable one. It is democratic. It is likely to strengthen the already existing barriers of race and class and to insulate middle class from reality. In fact there is a great deal to be said against it socially, and for this and other reasons the teaching of children in the home is illegal. But unless the decline of the public schools is halted soon, it will be a tempting alternative, in these places where it is not for bidden, for growing members of parents who wish their children to be well educated, and educated in an environment free from physical danger.

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