

**AN EVALUATION OF THE TEACHING OF  
COMPUTER SCIENCE IN SOME SELECTED  
SECONDARY SCHOOLS IN MINNA.**

**BY**

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MINNA.**

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**A Project submitted to the Department of Maths/Computer Science, School of Science and Science Education. Federal University of Technology, Minna in partial fulfillment of the requirements for the Award of Post-Graduate Diploma in Computer Science.**

## CERTIFICATION

This is to certify that this project was carried out and presented by Agnes Dauda Thomas of the Department of Maths/Computer Science in the School of Science and Science Education. Federal University of Technology, Minna, Niger State.

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Date

## **DECLARATION**

I declare that this project work is my original work and all references have been dully acknowledged in the text and referencing.

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AGNES DAUDA THOMAS

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DATE

## **DEDICATION**

This research is dedicated to God Almighty and to my late Mother Mama Daba Chedo and Mother in-law Mama Saratu Thomas for their loving kindness to the family.

## **ACKNOWLEDGEMENT**

I wish to sincerely express my gratitude to God Almighty for His loving kindness, wisdom and for sparing my life to enable me bring to completion this work.

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My thanks and appreciation goes to all the School principals visited, Ministry of Education, Inspectorate Division and the students learning Computer Science in the selected Secondary Schools.

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## ABSTRACT

To evaluate the effectiveness of teaching Computer Science in Secondary Schools with the aim of improving the teaching and learning of Computer Science through the use of varying methods of teaching. The researcher used two-postulated null hypothesis, two sets of linkert scale questionnaire was designed and interviews were also conducted on the Schools visited. The research revealed that two alternatives to null hypothesis were NOT REJECTED which stated that the Tutorial method had more advantage over the lecture method. It also showed that there is a positive relationship between secondary schools and private computer institutes. It is also evident that teaching is dynamic and teachers must learn new strategies of teaching. It is discovered that the Federal Government effort is appreciated but not adequate to supply all the facilities needed in Schools therefore a call for support from private organizations NGO's, P.T.A.'s Societies and Clubs in the community to encourage practical learning and teaching of computer science in schools.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 **Background of the study**

In every society, there is an educational system. However, objectives, methods and contents differ. The educational system should mirror the total system where by the society devices a means of meeting its needs and aspirations.

In 1977, the Federal Government of Nigeria published a policy paper called the National Policy on Education, which does identify the major goals of the nation. The goals of education are derived from these national goals, and the quality of the citizens will enable the country to attain them. As such their education must be geared towards providing the requisite experiences needed. One of the goals of education in Nigeria is stated thus;

“ The acquisition of appropriate skills, abilities, and competences both mental and physical as equipment for the individual to live in and contribute to the development of his society ”.

The school should prepare the individual to meet up with future challenges as the societal needs are advancing and changing with time.

It is in view of this that the federal government has selected some schools as model to introduce computer and some schools on their own have found it necessary to incorporate computer science in their curriculum. Many people still look at computer as mythical, but one of the ways of getting them literate is through our educational system, which starts from the primary, secondary, and tertiary level.

Dubey, Edem and Thakur [1978] stated that, " Education among other social institutions is a vehicle for changing society. It has been and is being used for transformation of economic, political and social system." In order to achieve this it calls for effectiveness in the teaching of computer science in secondary schools.

## 1.2 STATEMENT OF THE PROBLEM

Computer science is anew subject in our school curriculum with greater attention given at the tertiary level than in the primary and secondary school level. Computers have greatly influenced the various human activities as such the growing need in our offices, industries stores, supermarkets, hotels, libraries, hospitals, and schools make the teaching of computer science very important and should be given adequate attention to determine what is being taught in schools. This is because the quality of teaching will determine the performance of the individual at the end of the training.

Most companies make job advertisement requesting for applicants with additional qualification in computer science thus, being computer literate is an added advantage to gain employment.

With the growing need of computer education educational institution and private computer training institutes are increasing in number in towns and in cities that provide avenue for training people. These schools and private institutes if left unchecked by the authority the quality of teaching will affect the individual that pass through them and it would be difficult to check individuals on their duty post than while still undergoing the course of training. Evaluation is an important element of teaching that provides an

opportunity to correct teaching errors, make innovation that would affect proper teaching and learning.

In the light of this the study finds it necessary to promote effective teaching of computer science through the use of varying teaching technique and resources available in our schools.

### 1.3 OBJECTIVES OF THE STUDY

- i. To assess the effectiveness of teaching of computer science in secondary schools.
- ii. To attest to the fact that certain factors are responsible for the teaching of computer science.
- iii. To promote cordial relationship between educational institutions and computer training institutes.
- iv. To enforce proper supervision on the teaching of computer science by the Ministry of Education.

### 1.4 SIGNIFICANCE OF THE STUDY

- I. Using appropriate teaching technique would ease learning, better comprehension and enhance effective teaching in secondary schools.
- ii. Training opportunity would be accorded to the staff that would be teaching computer science.
- iii. Computer science curriculum would be made available at secondary school level.
- IV. Standardization in the teaching of computer science in educational institutions and computer training institutes would be given adequate attention.

V. Suggestions would be made on how to obtain funds to purchase materials for teaching computer science in schools.

### 1.5 HYPOTHESIS

- I. There is no significant difference between lecture method and tutorial method in the teaching of computer science in secondary schools.
- II. There is no significant difference between private computer institutes and secondary schools relationship in their contribution to the promotion of computer education in Minna.

### 1.6 SCOPES AND LIMITATION

The scope of this study shall cover six secondary schools and four private computer institutes in Minna. These schools selected are located in Minna metropolis namely, Government Secondary School Minna, Government Day Secondary School Tunga, Hill Top Model School Minna, College of Arts and Islamic Studies Tudun Fulani Minna, El- Amin International School Minna, and New Horrizon College Minna. Also the four private computer institutes include Muhannatu computer institute, Data Tech. Institute Minna, Ami-Tech Institute and Data Soft / Logigate computers they fall within Bosso, Chanchaga and Minna Local Government Area of Niger State.

With the creation of additional local Government Areas in Niger State there are forty two of them, but due to time and financial constraints and for the purpose of this study the selected schools from the local government Areas would be considered and not all the entire local Government areas in the state.

The study would have an over view of the teaching of computer science with particular interest in the methodology and the resources available and ways of promoting the quality of teaching computer science in schools.

## CHAPTER TWO

### 2.0 REVIEW OF LITERATURE

#### 2.1 THE PLACE OF COMPUTER IN OUR SOCIETY TODAY

The versatility of the computer technology has manifested in its application to all spheres of human endeavour. Almost every profession has a feel of the computer Folorunsho (1995) stated that, "all one needs as a professional is a tool to assist in getting the right type of information in the deserved format and the appropriate time".

Dr. Okon (1991) described computer as "man's test tool and bedrock of development, it has the power of harnessing, storing and providing access to useful information".

This shows the important of computer as the basis of technological development and why developing countries aiming at technological development should keep abreast of the ever- changing computer world.

The encyclopedia Britannica (1980) defined computer as " an electronic machine that is capable of accepting data, performing operations according to instructions and providing the results of operations".

Kalu (1987) added, ".....the main agent of this technological advancement is the ' wonder machine' called computer".

It is obvious that computer has gained grounds in its operational applications in areas such as offices, banks, post offices, engineering establishments, airlines, medicines, manufacturing, education, agriculture, entertainments, transportation and other fields of human endeavour.

It is important to note that the efficient performance of these computers depend on their type such as digital, analog, and hybrid. While classification includes,

mainframe, mini, micro and super-computers. There is a computer program that instructs it to do what it should do and how to do it.

Fapohunda (1996) defines computer software as " a collection of programs .....which is basically two kinds, system software and application soft ware."

Super computers are the biggest and the most complex type of computers systems they are designed to handle mathematical calculations involving very large number of variables such as is used for weather forecasting, at very high speed. For example the supercomputer used in the British meteorological office complete about one billion calculation in just four minutes. Another example is (Cray 1 and 2) computers built by Cray Research Company of U.S.A. These computers are common in U.S .A, but not yet available in Nigeria.

Sergeev and Vaskerich (1976) declared that electronic computers have proved their worth in automatic control of processes, plants and system. Advances in computer engineering have given big impetus to cybernetics, the science of control and communication in the animal and the machine as (N. Wiener put it). Today, automatic control is being applied in a multitude of industries, branches of science and technology from automated systems in metallurgy, chemistry, mechanical engineering and power generation to highly sophisticated aerospace systems.

Airline Reservation, Flourish (1995) said, computers are used to ease the process of airline seat reservations. Airlines use central computer, which is linked to communication network system. Each Booking office is equipped with a number of Visual Display Unit that is terminals linked to the computer.

However, human error in not giving the computer the appropriate instruction had caused man a great loss. For instance the Mariner I space craft was launched from Cape Canaveral, U.S.A on July 28,1962 toward the planet Venus. The craft was controlled by already programmed computers but the

scientists were surprised that the Mariner I craft turned back and fell into the Atlantic Ocean only four minutes after take-off. An arithmetic sign was said to have caused the loss of the sum of U.S \$ 10 million dollars.

Fapohunda noted that, there had been several cases of computer fraud in the developed countries with few cases recorded in Nigeria a developing nation.

A Telex instruction from Nigeria requested a bank transfer of \$ 24m to an account in small California bank.

The receiving bank questioned the transfer because the account had only a \$10 balance Morgan Checked and discovered that it was a forgery (potential loss \$24m). Medical practice, today, the control and regulation of body system failures, diagnosis efficient operation like scanning of brain and proper management of patients are some of the medical practices people benefit.

Vanguard, Wednesday April 20, 1994 reported by Reuben Muoka that Nigerian's first indigenous computer company Data Sciences Nigeria LTD, (DSNL), made a strong case for the use of computer in the nation's health care delivery system and medical practice in general. Mr. Obafemi one of the resource person in his presentations highlighted the need of various applications already based in medical practice like the integrated Hospital information System (IHIS) with computer as the vehicle of information exchange between the various operational departments. Within a hospital examples are patient's admission, radiology, pathology, medical records, dietary management, and pharmacy among others.

Data processing and efficient information systems should enhance the management of hospitals today. A Paris based Inserm Institute developed MEDIC to help health workers with minimal training to diagnose more accurately and day out treatment plan.



## LEGAL PROFESSION

The computer is indispensable if the administration of justice in all its ramifications is to keep pace with development of human society in other important areas like commerce, economics, crime, its detection, prevention and punishment and above all, in governance Deji (1992).

Computer can be highly invaluable in planning and forecasting since it can show the effect of making change. In agriculture in form of drought, projects, food shortage and irrigation system in arid areas. Source: the Nigerian Tribune 7, March-1989. In Nigeria mainframe and minicomputers are used in institutions like Nigeria National Petroleum Corporation (NNPC), the Shell Petroleum Development Company and Central Bank of Nigeria (CBN) which have the capabilities of linking many smaller computers.

While minicomputers are found in institutions as the Joint Admissions and Matriculation Board (JAMB) and the West African Examination Council (WAEC) computers have many different tasks possible to be accomplished by man such as secretarial services, writing of letters and reports, Printing books, News papers and Magazines, drawing of pictures and diagrams, doing statistics, Mathematics, and handling of financial records, making and playing of music, video films on compact disk, sending messages to other persons anywhere in the world. And being resource equipment for teachers and learners computers have made easy research and data retrieval.

## 2.2 COMPUTERS IN EDUCATION

Computers have caused great changes in education with regards to adding new dimension and enhancing the quality of teaching. Artificial intelligence which is the science of developing computers to carry out functions normally associated with human intelligence for instance to teach, have contribution immensely to this aspect of life.

Many Governments have made policies regarding the use of computers in education Tim Ocean and John Self (1983) stated that even in recession Government have it wise to encourage the use of computers in education for three reasons;

1. Children need to be aware of the nature and uses of computers in order to be able to cope with the present and future technological society.
2. Computers can help with some administrative chores, such as maintenance of student's records and the scheduling of classes.
3. Computers can help to improve the learning process.

Chambers and Bork (1980) observed that the number of computers are rapidly increasing in schools, he estimated the percentage of U.S schools districts using computers for instruction had increased from 13 percent in 1970 to 74 percent in 1980, and the French Ministry of education was well on the way to its objectives of installing 10,000 microcomputers in secondary schools by 1985 Hebenstreit , (1980). The school district of Philadelphia has used computers in instruction since 1966, in drills, tutorials, simulations and information retrieval systems.

Others include resource centers and science museums using computers to train public, distance learning in an Open University system where candidates receive instructions in their various destinations. Also meeting special needs of handicap children where they are opportune to learn according to their ability.

Forty years of computing at the University of Glasgow declared that, in 1957 the university appointed Dr. (Late Prof.) Dennis Gilles to establish a computing laboratory. Over 40 years the laboratory had grown into a strong and flourishing computing service a world class Department of computing science and indirectly a myriad of innovative applications of computing to teaching, learning and research in almost every part of the university.

The encouragement received and advancement in computer science had their root from the different vision advocates of computers assisted learning had in the time past. According to the Hydraulic theory, knowledge is a kind of liquid, which resides copiously in teachers and books as in great vessels and hardly at all anywhere else particularly it is scarce in small vessels known as students. The purpose of education they believed is to transfer this liquid from larger to smaller vessels. The most recent advance in Hydraulic theory and certainly the most exiting is the use of computer and the multimedia console as a means of mediating programmed instruction.

The console with its graphic display and audio channels is able to reach the student with flood of visual and auditory stimuli that leads to the brain stated by the Paul M. Davies, 1969.

Computer assisted learning activities include Educational Games, constructions of Tutors, Formulation of Programmes by students for problem – solving and providing adequate learning environment as Piaget stressed that the spontaneous interaction with the environment by which mental growth occurs and concluded that the teacher's main task is to foster condition under which

each child can think freely. Duck Worth (1964) quoted Piaget as follows "The chief outcome of this theory intellectual development is a plea that children be allowed to do their own learning---you cannot further understanding in a child simply by talking to him. Good pedagogy must involve presenting the child with situations in which he himself experiments in the broadest sense of the term".

Pask and Scott (1972) devised two kinds of training programme one for serialist and the other for holists. They discovered that a student learned more effectively if given a programme, which matched his sort of competence, but did not do so if there was a mismatch.

### **GAMES-**

A computer game is a computer-based activity, which leads its participants to leap joyfully. Computer games are said to be popular and captivating due to some reasons. Banet (1979) listed features that make for successful computer games among others as:

- I. Audio-Visual effects are used to rewards success and to present game situation.
- II. The computer able to time the player's responses and calculate scores.

Malore (1981) surveyed children about their preferences about 25 computer games in which described three characteristics of intrinsically motivating environment as the challenge, curiosity and fantasy, the games provoke mental images not present to the senses. Computer games also aid learning while enjoying the interaction involved.

### **SIMULATION**

To teach certain concept that may be dangerous or demonstration of certain kind where students may not have access to computer in this case can be as a laboratory learning by seeing. Mckenzie (1977) described computer as a

laboratory, interactive, graphics, typically small programs, which is used to teach things like Cardiac output in biology, nuclear reactions, moon's orbit around the earth. John Shelley and Roger Hunt declared the use of computer programming in the control of experiments, administration, salaries, local Government Authorities, Time table planning, keeping of students record, career guidance in addition to computer assisted instructions programmes.

The National policy on education (1981:16) has defined secondary education as " the form of education children receive from after primary education and before the tertiary stage, it has specified the aims of secondary education to include among others: "To equip students live effectively in our modern age of science and technology".

Dr. A. Okon (1999) opined that the government should provide well-trained teachers, adequate facilities; provide quality control through the inspectorate division federal and state or local level to ensure standards are met in schools.

### **2.3 FACTORS CONTRIBUTING TO EFFECTIVE TEACHING**

Nacino-Brown, F. E and P. Brown (1982) defined teaching as, an attempt to help some one acquire or change, some skills, attitude, knowledge, ideal or appreciation".

The writer maintained that the only criterion of success in teaching is the degree to which the teacher has been able to achieve this learning in his students .in fact teaching embraces a number of factors that contributes to its effectiveness, some of these include personal characteristics of teachers (teacher's psychology) professional characteristics of teachers. Flanders, N.A (1970) discovered that certain personalities of teachers are highly ranked such as, sympathy, kindness, helpfulness, patience, a pleasing personal appearance and

manner; emotional stability and self control, others that are low ranked are fairness, impartiality, a sense of humour, honesty, enthusiasm, creativeness and resourcefulness. These ranking of personalities characters support the idea that an effective teaching is obtained from that teacher who uses most of these characteristics in relating well with his learners. Nacino Brown and et al (1982) strongly believed that a teacher might have most of these qualities and yet not knowledgeable in the subject areas, such teacher is said to be unsuccessful. These professional characteristics are: " having a mastery of the subject matter to be taught, an understanding of the basic principle of children 's growth and development, a good general knowledge of methods and techniques, a positive attitude to work, willingness to adapt his or her teaching, taking into accounts the materials available and courage to struggle for better standards in the school ".

A very important factor earlier mentioned is an understanding of the children's growth and development and how it affects learning and the influence on teaching.

Wilkins (1975) stated that, mental activity is a kind of chain reaction. Sensation leads to perception, perception to cognition, cognition may produce desire results in organization or conception based on previous learning and in motor activity through the effectors – nerves.

Thus, all learning is based on association, which establishes connection between brain cells, physical development of the child has to do with chronological age as it relates to his preparedness to learn.

R. Chapman- Taylor (1976) is of the view that it is needful for the teacher to know the various aspects of the learner. The knowledge of the learner enables the teacher to plan and organize children's learning experiences according to their mental capabilities and age. D.A Balogun and et al (1981) declared that, children's rate of learning will be affected by their age, previous experiences,

capacity motivation, the conditions under which learning takes place, and by the nature of the material which has to be learned. The most successful teachers are those who are able to relate their subject matter to the needs of their pupils, using these needs as motivating devices.

Koontz, O'Donnell and Wehrich (1980) Motivation as Berelson and Steiner define the term, a motive, is an inner state that energizes, activates or moves (hence motivation) and that directs or channels behaviour towards goals. In other words motivation is a general term applying to the entire class of drives, desires, leads, wishes and similar forces, likewise, to say that managers motivate their subordinate is to say they do those things which they hope will satisfy these drives and induce the subordinate to act in a desired manner.

Taylor (1978) affirms that children had a number of needs that must be satisfied if they are to grow and develop towards maturity in a healthy way. These needs are physical and psychological needs. For the teacher to teach effectively it is his responsibility to make use of a variety of instructional materials, textual, and non- textual their management and adequate utilization, discipline of the learner and evaluation of students progress will bring about the attainment of the predetermine goals and objectives of the teacher.

## CHAPTER THREE

### **3.0 RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Research design**

The research design for this study is the survey method.

The survey involves simple random sampling of schools that offer computer science, the teachers that teach the subjects, selected principals, inspectors of education and tutors in some selected private computer institutes.

A set of questionnaire was designed and distributed in some selected secondary schools and oral interviews were also conducted.

#### **3.2 Population of the study**

The population of the study was two hundred and twelve subjects. It comprised 122 students 80 teachers and Tutors of computers and 10 others including principals, inspectors of education and directors of private computers institutes.

The researcher used 4 government secondary schools, 2 private secondary schools and 4 private computer institutes all within Minna metropolis but spread along the inspectorate zones namely, Minna, Bosso and Chanchaga.

#### **3.3 Sampling technique**

A simple sampling technique of random selection was employed to ensure that each zone was represented and that the secondary schools selected have computer science among the subjects taught to them.

#### **3.4 Research instrument**

Two sets of Linkert scale type questionnaire was designed for teachers in secondary schools and private computer institutes. Other instruments were



experiments, personal interviews and observations conducted in the schools visited.

### **3.5 Administering the instruments**

#### **I. Questionnaire**

The researcher personally distributed the questionnaire to secondary schools and computer

Institutes and ensured that they were properly filled.

#### **II. Interviews**

The researcher interviewed some students, principals, inspectors of education and some directors of private computer institutes.

#### **III. Observation**

The researcher had the privilege of visiting all the schools earlier mentioned inspecting some of their computer laboratories to ascertain the usability of the available resources, the quality of such materials and also visited some schools while in session to study their approaches in teaching computer science.

#### **IV. Experiment**

Two methods of teaching were adopted. These were lecture method and Tutorial method. This is to enable the researcher to find out which is more effective for the teaching and learning of computer science in schools.

### **Procedure**

Teaching was conducted in a class three of junior secondary school with the same material using the two approaches for two different groups of 36 students each. The population of the subjects used were 72 in New Horizon College Minna. The students were grouped into two namely, the experimental

group was taught using the Tutorial method while the control group was taught using the traditional Lecture method.

A simple programmed lesson with test items generated after teaching was employed using Visual Basic 6.0 software package.

### Tests

They were conducted on 9 groups of 4 students each. The following scores were obtained using Lecture method 8,7,6,6,4,5,3,7 and 2 and 7,7,8,9,8,6,9,10 and 7 using tutorial method, the maximum mark obtainable was 10.

### Procedure for analysis

Let  $U_1$  and  $U_2$  represent the average grades of all the students that took the course by lecture and Tutorial methods respectively. Using the six steps procedure we have:

$$(i) \quad H_0 = \mu_1 = \mu_2 \text{ or } \mu_1 - \mu_2 = 0$$

$$(ii) \quad H_1 = \mu_1 \neq \mu_2 \text{ or } \mu_1 - \mu_2 \neq 0$$

Where  $H_0$  is the null hypothesis and  $H_1$  is the alternative to  $H_0$ .

### Analysis

$$(iii) \quad \alpha = 0.05 \text{ (level of significant)}$$

$$(iv) \quad \text{Critical region: } t < -1.746 \text{ and } t > 1.746$$

Where  $t = (\bar{x}_1 - \bar{x}_2) - d_0$

$$Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \quad \text{with } V = 16 \text{ degree of freedom}$$

## Computation

$$X_1 = 5.3 \quad S_1 = 1.9 \quad n_1 = 9$$

$$X_2 = 7.9 \quad S_2 = 1.0 \quad n_2 = 9$$

$$\text{But } S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

$$= \sqrt{\frac{(8)(3.61) + (8)(1)}{8 + 9 - 2}}$$

$$= \frac{\sqrt{28.88 + 8}}{16}$$

$$= \sqrt{\frac{36.88}{16}} \text{ or } \sqrt{\frac{9.22}{4}}$$

$$\therefore t = \frac{(5.3 - 7.9) - 0}{4.61}$$

$$= \frac{\sqrt{\frac{9.22}{4}} \times \sqrt{\frac{1}{9} + \frac{1}{9}}}{4.61}$$

$$= \frac{(-2.6)}{4.61}$$

$$= \frac{9}{-23.4}$$

$$= \frac{-23.4}{4.61}$$

$$= -5.08$$

with  $t = -5.08$  implies  $t < -1.746$ .

### **Decision**

We reject  $H_0$  and conclude that the two methods are not equal. Since the computed  $t$  value falls in the part of the critical region with left tail of the distribution.

Thus, we conclude that the tutorial method is superior to the lecture method in the teaching of computer science.

The procedure for computer institutes-school relationship in the promotion of computer education. The statistical method used was the Pearson Correlation Coefficient to determine the level of relationship and the effect on teaching of computer science.

Some points were emphasized using tables and percentages.

Private Computer institutes – School relationship in the promotion of computer education.

Table 1.

	R. Scores	Ranking $-X_1$	R. Scores	Ranking $-Y_1$	Devia tion $d_1$	Deviati on $d_2$
<b>1. <u>Better Promotion of Computer Education</u></b>						
a. Subsidy to Students	15	9.5	10	6	3.5	12.25
b. Provision of manpower	15	9.5	20	14	-4.5	20.25
c. Provision of career prospect	8	5	8	2	3.0	4.00
<b>2. <u>Benefits so far</u></b>						
a. Exchange of new ideas	5	2.5	10	6	-3.5	12.25
b. Enlightenment to youths	18	13	15	11	2.0	4.00
c. Soliciting for aids	15	9.5	13	10	-0.5	0.25
<b>3. <u>Effective teaching</u></b>						
a. Good teaching method	10	6.5	10	6	0.5	0.25
b. Adequate time for teaching	10	6.5	10	6	0.5	0.25
c. Availability of qualified teachers	18	13	18	12.5	0.5	0.25
<b>4. <u>Kinds of relationship</u></b>						
a. Indifferent	5	2.5	2	1	1.5	2.25
b. Cordial	15	9.5	10	6	3.5	12.25
c. Very cordial	18	13	26	15	-2.0	4.00
<b>5. <u>Areas of emphasis during training</u></b>						
a. Hardware	3	1	10	6	-5.0	25.00
b. Software	28	15	10	6	9.0	81.00
c. Both & others	7	4	18	2.5	-8.5	72.25
$\Sigma d_1 = 255.5$						$\Sigma d_2 = 255.5$

## Analysis

The procedure for analysis is the rank correlation coefficient and it is as follows:

$$r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

$$= \frac{1 - 1}{n(n^2 - 1)} = \text{where } d_i \text{ is the diff.}$$

between the ranks assigned to  $x_i$  &  $y_i$ , and  $n$  is the number of pairs of data.

$$\sum_{i=1}^{15} d_i^2 = 255.5$$

$n = 15$ ,  $X_i$  = rank sch data and  $y_i$  = rank assigned to  
Computer institutes data.

$$r_s = 1 - \frac{(6)(255.5)}{15(255 - 1)}$$

$$= \frac{1 - (6) 255.5}{15(224)}$$

$$= \frac{1 - 1533}{3360}$$

$$= 1 - 0.4563$$

$$= 0.543$$

$$= 0.54$$

### Interpretation

The critical value for testing the null hypothesis ( $H_0$ ) that the rank correlation coefficient is zero against the alternative hypothesis ( $H_1$ ) that it is greater than zero.

With  $\alpha = 0.05$  (level of significant) and  $n = 15$  is 0.441. We reject  $H_0$  if  $r_s > 0.441$  as our calculated value was  $r_s = 0.544$  approximately.

Thus, we conclude that at 0.05(level of significant) there is a high positive correlation existing between the secondary schools and private computer institutes in promoting computer education.

## CHAPTER FOUR

### **4.1 DATA ANALYSIS AND DISCUSSION OF RESULTS**

This Chapter attempt to analyze and discuss the data collected from test and non-test techniques during the study based on the hypothesis earlier on postulated by the researcher.

Descriptive analysis is given of the two sets of questionnaire, interviews conducted and the results of the two null hypothesis. 38 out of 40 questionnaires were filled and returned.

#### **Descriptive analysis of secondary school questionnaire**

When asked which method of teaching do teachers use in teaching computer science in secondary school, 10 (26.3%) each responded that they use Lecture and discussion method respectively while a greater number 18 (47.4 % ) used demonstration method. This revealed that the demonstration method is preferred to the other methods of teaching.

H0.1 There is no significant difference between the Lecture and Tutorial Methods in the teaching of computer science in secondary schools.

The analysis of the work is shown in chapter three, pages 18 - 19. The null hypothesis above was rejected and the alternative which stated that Tutorial method was superior to Lecture method in teaching computer science was accepted. This can be attributed to the fact that Computer Assisted Instruction is one of the means of changing traditional ways of teaching to the modern with enormous advantage.

Adeoye (1999) in his study Computer in Nigerian Schools identified the following advantages alienated to Computer Assisted Instruction (CAI);



- i. Provide ideas and skills not easily obtained in other forms of instruction;
- ii. Make learning more interesting and meaningful to students;
- iii. Capacity building of both students and the teachers is greatly enhanced with the use of (CAI). This also encouraged the spirit of cooperation amongst the students.

### **Human Resource Available**

In response to the question, how many teachers do you have that teach computer science? It was found that twenty (52.6 %) respondents had between one to three teachers only in their school, fourteen (36.8%) reported between 4-6 teachers and the least respondents with four (10.5%) had four teachers and above. This indicates inadequate number of teachers for teaching computer science.

**Table II. Availability of facilities.**

Facilities	Respondents	Percentage
Inadequate	23	60.5
Fair	10	26.3
Adequate	5	13.2
Total	38	100

From the above table , it is cleared that twenty three respondents (60.5%) revealed that there is inadequate provision of facilities in schools ,while ten (26.3%) accepted fair and five only (13.2%) ticked adequate.

### **Material Resource: Provision of curriculum to school.**

The educational need of the society is usually reflected in the curriculum of the school and as such, its provision and contents require professional hands.

In response to how the school come by the curriculum of studies, eighteen (47.3%) respondents reported that they copy from text books or self design, fifteen (39.5%) got theirs from renown university and the least respondents five

(13.2%) Obtained from the Ministry Of Education, which was supposed to be the monitoring agent for such a vital document in the school.

**Table III. Motivational factors**

Parents Teachers Association	Respondent	Percentage
Commend teachers	10	26.3
Commend students	10	26.3
Provide facilities	18	47.4
Total	38	100

This shows that the Parent Teachers Association is a group that has interest in the school programmes and thus supporting the teaching of computer science in the secondary schools.

**Table IV. School Management**

Motivation from school mgt.	Respondents	Percentage
Commendation on students	20	52.6
Prizes	18	47.4
Scholarship	0	0
	38	100

This reveals that the school management gives high commendation on students and also awards prizes but nothing is done on about scholarship as an incentive to the student's learning.

## **INTERVIEWS**

4.2 Results of interviews conducted amongst students, Principals, Directors and supervisors in the ministry of education.

### **STUDENTS**

During the interview with the students of computer science in secondary school many of them showed interest in learning computer science and desire that the

subject be taught to all the classes that is Junior to Senior Secondary School level. The primary school had more interest on games and films less attention is given to them by the ministry. Students added that not all of them usually had access to the computer and some courses were difficult to comprehend given to its newness in school.

### **PRINCIPALS**

The school principals reported that the population of the students compared to the number of the teachers was not commensurate. Teachers though few, were doing their best and the students too had shown high interest in the learning of computer science.

In response to how they got these computers, it was reported that the Federal Ministry of Education,

Education Trust Fund (E.T.F) in collaboration of the technical partner from South Africa supplied the Personal Computers to the State Ministry of Education who in turn selected five secondary schools in Minna with a total of twenty computers each connected to Internet. They also complained that there was no unified syllabus for teaching computer science at the time this research was conducted.

Directors from private computer institutes were of the opinion that the Ministry of Education should

Get them well informed about any role they would want them to play in the school's programme as a way of making their contribution to the development of the youth.

From the ministry of education supervisors revealed that the sampled schools that benefited from the Federal Government project were very fortunate and must do their possible best within their reach to impart this knowledge to the students and teachers alike. They also reported that the financial resources available could not cater for all the schools in Minna or Niger State. Only five States were

beneficiaries of the program namely, Niger, Cross River, Nassarawa, Ogun and Plateau State.

#### 4.3 Results of the analysis of questionnaire for computer Training Institutes.

In 1991– 95 five (13.2%) respondents revealed that few computer institutes were established in Minna, the number increased in 1996 – 2001 with fifteen (39.4%) people declaring that passively and by 2001 and above 18 persons (47.3%) Showed another improvement over the previous years. Since then, there has been a rapid and steady increase in the establishment of computer institutes in Minna. Similarly these institutes recorded large turn out of graduates from 100,200 300 and above, this up serge has caused many to become computer literate.

Table v. Graduates from Computer training Institutes.

Number of Graduates turn out	Respondents	Percentage
(a) 100 graduates	10	26.3
(b) 200 graduates	13	34.2
(c) 300 graduates	15	39.5
Total	38	100

From the response of how these institutes come by the curriculum they use, it was found that these institutes do not have a common source of obtaining their curriculum of studies and as such there could be variation in the content. Twenty (52.6%) responded that they designed their own curriculum, thirteen (34.2%) obtained theirs from Professional bodies and five (13.2%) got from the ministry of Education or (ERC).

#### **Supervision:**

Computer Institutes are mostly private owned training centers that had little or none supervision given by the Ministry of Education .the responses showed the frequency of supervision ten (26.3%) declared none supervision and randomly respectively while eighteen (47.4 %) respondents said annually this calls for more attention for better quality of teaching.

#### 4.4 Contributions made by computer institutes and secondary schools relationship.

In the data analysis of the relationship between computer institutes and secondary schools Pearson correlation Coefficient was the Statistical method used on the postulated null hypothesis that stated that: **There is no significant difference between private computer institutes and secondary schools in their contribution to the promotion of computer education in Minna.**

Data presentation is found in chapter three Page 20 Table 1.It was found that there was a high positive correlation between secondary schools and computer institutes. This relationship has brought about mutual benefits and better understanding between the groups. Thus, a large number in the society are opportune to be trained using the computer as the instructional medium that enhanced faster teaching and learning computer.

## CHAPTER FIVE

### **5.1 DISCUSSIONS AND FINDINGS**

The computer - In-Schools Initiative (CISI) was headed by Chief Leo Stan Ekeh the chairman of Zinox technologies Limited the pioneer personal computer manufacturer in Nigeria. A federal Government Programme initiative aimed at providing our Primary and Secondary schools with access to critical information through the delivery of computer hard ware, soft ware and internet solutions to be secured through donations to prepare Nigerian youths for immediate and future challenges in information technology. The research findings showed that the Federal Government desired earnestly to actualize their dream in bringing computers to the classroom. This demands a huge financial implications adequate trained manpower especially for teachers who will in turn impart this knowledge to the young secondary school students.

#### **5.1.1 STAFF DEVELOPMENT AND MOTIVATION**

Human resource management is a vital issue if the federal and State government must achieve their objectives in introducing computers to schools. Staff development or training should be a priority to enable the teachers attend workshops and seminars organized by the government or private organizations .The research showed that many teachers are willing and ready to be trained and would like to acquire higher degree in computer science which will enhance their performance in school.

Human beings need to be motivated so that they can give their maximum out put. Both students and teachers need varying incentives to promote teaching and learning of computer science. The private secondary schools have better laboratories, adequate facilities and sizeable population for the number of

personal computer they had how ever, they have the problem of inadequate manpower.

The research findings revealed that many parents were happy about the introduction of the course in the school and wish to encourage their children to learn, Since some of the parents had no computers this created great opportunity for their wards and children to be computer literate.

#### 5.1.2 INTEGRATED METHOD

The teacher is not only faced with the challenge of becoming computer literate but also to know how best the knowledge gained can be imparted to the students. In teaching computer science the choice of method of teaching is very important in the classroom situation, which normally is informed by the concept, topic to be taught, characteristics of the pupils, the available teaching sources and the type of objectives to be achieved. Some methods of teaching computer science have been identified as follows:

Discovery method, Discussion, Project Method, Games, Field trip, Demonstration, Computer Programmed Instruction, Tutorial method amongst others. In most schools the population was large so that the classroom teacher could not carry out effective Practicals during computer lessons except students were grouped this method was found suitable with Tutorial method the students had the opportunity to share their ideas and have access to work on the computers. The method saved time and encouraged the spirit of cooperation among the students. In teaching computer science the teacher ensured that the lessons are activity based and often with practical approach unlike the conventional Lecture method where students sat passive during the lesson. This did not aid retention and comprehension of instruction.

5.1.3 The role of the Ministry of Education in standardization of computer science teaching.

the National Policy on Education (1977) the Government attached great importance to well staff inspectorate services for all levels of education. This and simply means it is absolutely necessary and essential to have efficient capable and highly enlightened supervisory and inspectorate cadre of people in various ministries of education at all levels if government educational objectives are to be achieved. This research showed a rapid spread of private computer institutes and government schools too. Some private computer institutes give exorbitant charges to the students in their centers, which is not commensurate with the quality of training they offer. This calls for concern that the inspectorate division should enforce standards in teaching computer science through regular visits to institutes and school, provide them with continuous definitions of goals, nurturing creative approach to the problems, ensuring that the course contents need the need of the society and providing any useful information that would enhance learning and teaching of computer science. The research revealed that some schools and computer institutes designed their curriculum of studies, this suppose to be a professional work and must be handled with much seriousness in order to control the quality of teaching.

#### **Some problems identified**

- i. The ratio of students to one computer was 4 or 5:1
- ii. Only five schools in Niger state have benefited from the school net project provided by the Federal Government
- iii. These computers are not versatile, though have Internet connectivity.
- iv. Most schools do not have conducive atmosphere in their laboratories, they lack constant power supply, stabilizers, air conditioners not adequate but have fans.
- v. Qualified personnel are lacking and the few available are overworked.
- vi. No unified syllabus for the course.



- vii. The process of training teachers is slow so they have not been able to make adequate use of the computers to teach in their subject areas.

## **2. Summary Conclusion and Recommendation**

The project work on the evaluation of the teaching of computer science in secondary schools began with a simple random selection of four secondary schools within Minna metropolis. Two likert scale questionnaire were designed as research instrument (Appendix A) for secondary schools and computer institutes (Appendix B) others include observation of the facilities in the schools interviews and test were also conducted. After two weeks of teaching a test was prepared and administered on the two groups the control group was taught using Lecture method while the experimental group was taught using Tutorial method. The result showed that the Tutorial method had an advantage over the Lecture method. The researcher used the test concerning mean to analyse the scores. Two null hypothesis were postulated and tested statistically by a method known as Pearson Coefficient Correlation to determine the level of relationship between computer institutes and secondary schools. The result showed that there was a high positive relationship between two groups, which yield mutual benefits by promoting computer education in our society.

The research made it obvious that certain factors were responsible for the effective teaching of computer science and these included; good method of teaching, adequate facilities, supply of personal computers, adequate and qualified personnel and adequate provision of instructional materials example curriculum and text books for learning.

The quest for computer literacy can not be achieved by the government alone, it is therefore a corporate affair with the contributions of private organizations, Parent Teachers Association, industries and private institutes to promote

computer education. It is important for the government to bring about a conducive atmosphere for this cordial relationship.

### **Recommendations**

1. Each school should ensure that it has a strong Parent Teachers' Association body that would complement the effort of the government in provision of some facilities needed;
2. The school can organize open days, quiz competitions science clubs or computer science club where students can learn among the members or raise funds to buy some of the computer accessories that are required by the school;
3. The school can sub-charge a little fee to enable them purchase some things for instance raise a block of class for a computer laboratory.
4. The government should encourage corporate ventures between secondary schools and private computer institutes so that other schools would have the opportunity to learn computer science. Since not all the schools have provision of personal computers more so, it is capital intensive.
5. In service training should be organized on termly basis for the teachers to update their knowledge on current issues.
6. Field trips or demonstration classes should be organized to widen the scope of the student's knowledge on computers. Other friendly application packages could be used like Windows and Microsoft Disk Operating System (MS DOS) to enhance the knowledge of disk operating system which is lacking in their school systems;
7. Since computer literacy is not restricted to government schools alone, every necessary effort must be put in place to enforce good regulation of computer institutes, as well as government and private schools;

8. A unified curriculum structure should be provided to all the schools and our Educational Resource Centres should be properly put in place where students have access to go and learn computer basics;
9. Computer literacy course should be included in all teacher education programmes and be made compulsory in those secondary schools where computers are provided.

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- (a) Subsidy for Student's learning (b) Provision of manpower/ Facilities for learning  
(c) provide carrier prospect.
11. Which aspect do you emphasize during your training? (a)h hard ware (b) Software (c)  
Both
12. Would you say the relationship provides opportunity for: (a) Exchange of new ideas  
(b) Enlightenment programmes (c) Soliciting for aids from corporate bodies
13. Which method of teaching do you employ in the teaching of computer science? (a)  
Teacher center method (b) Discovering method (c) Demonstration method
14. How often is your school supervised by Ministry of Education ?  
(a) Bi-annually (b) Quarterly (c) Annually
15. Which would you consider most necessary for the effective teaching and learning of  
Computer Science?
- a. Provision of adequate time for teaching
  - b. Provision of facilities and instructional materials
  - c. Availability of qualified teachers

**INTERVIEW QUESTIONS**

**School Head/Ministry of Education Minna.**

1. What is the name of your School?
2. What is the Students' population?
3. What is the population of your teaching staff?
4. How many teachers are computer scientists?
5. How many personal computer units do you have in the School?
6. What are the other facilities available?
7. How did you get your personal computer Units?
8. What motivated the management to introduce computer science in the School?
9. How would you rate the interest of your teachers and students in the teaching and learning of computer science?
10. What has the management done to motivate the teachers and learners in the teaching and learning of computer science?
11. How did the school obtain its curriculum and what is the method of evaluation?
12. ....

**STUDENTS INTERVIEW**

Class .....

Age .....

How would you rate your teachers in their teaching of computer science?

Did you have pre-knowledge of computer science before its introduction in the school?

What courses do you find easy?

Which do you find difficult? .

Do you wish to continue with this subject in senior secondary school?

Do you write test, assignment or exams on this subject? Please specify .....



## Questionnaire for computer Institutes

( Appendix B )

### Introduction:

This questionnaire is designed to assess the contribution of computer training institutes on computer education. Please complete this questionnaire and try to be honest in your responses.

1. Status.....
2. Highest educational qualification.....
3. When was the institute established?.....  
(a) 1991 -1995      (b) 1996 – 2001      (c) 2001 – above
4. Who approved the establishment of this institute?  
(a) L.G.E.      (b) M.O.E/F.M.OE      (c) Professional body.
5. Which certificate do you offer?  
(a) ordinary Cert.      (b) Advance Cert.      (c) Higher Diploma
6. Which institute of higher learning are you affiliated to?  
(a) None      (b) Polytechnics      (c) University
7. Since the inception of this institute how many graduates have you turn out?  
(a) 100,      (b) 200      (c) 300
8. Who designed the curriculum you use?  
(a) Self      (b) Professional Body      (c) Curriculum designers/M.O.E.
9. How often is your institute supervised or inspected? By M.O.E.?  
(a) Not at all      (b) At random      (c) Annually.
10. In the course of your training, which area do you emphasis?  
(a) Hardware      (b) Software      (c) Both and others.
11. How would you rate the relationship between your organization and educational institution  
(a) Indifferent      (b) Cordial      (c) very cordial
12. What has your organization done to promote computer education in Schools.  
(a) Provide subsidy for students tuition      (b) Provision of manpower/facilities for training  
(c) enlightenment programme/carrier prospect.
13. What would you stand to benefit in your relationship with secondary schools?

- (a) Exchange of new ideas
- (b) Opportunity to reach out to the youths
- (c) Solicit for aids from corporate bodies.

14. Which of the following do you consider most necessary for effective teaching and learning of computer science?

- (a) Good teaching methods
- (b) qualified teachers
- (c) Provision of quality time/facilities for learning.

# PROGRAM OUTPUT

Computer Hardware Tutorial for Secondary Schools

Lessons Questions Help Exit

- Introduction
- Input Devices**
  - Keyboard
  - Mouse
  - Other Input Devices**
- Output Devices
- Central Processing Unit (CPU)
- Storage Unit

## COMPUTER HARDWARE TUTORIAL

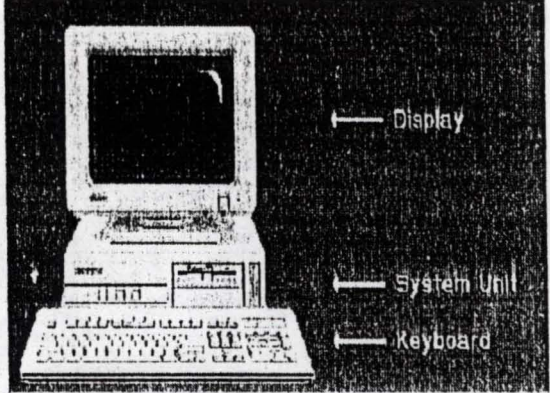
FOR

## SECONDARY SCHOOLS

PGD PROJECT BY MRS THOMAS  
MATHEMATICS/COMPUTER SCIENCE DEPARTMENT  
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA.

Computer Hardware Tutorial for Secondary Schools

### BRIEF INTRODUCTION TO COMPUTER



A diagram of a computer system. It shows a monitor (labeled 'Display'), a central processing unit (labeled 'System Unit'), and a keyboard (labeled 'Keyboard').

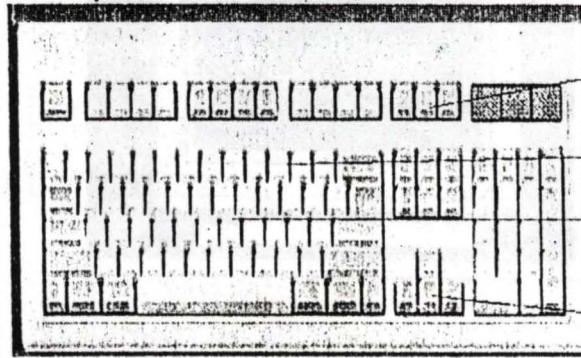
A Computer is an electronic machine, which accepts and process data by following a set of instructions to produce an accurate and efficient result.

The computer system consist of four elements:

1. Hardware
2. Software
3. Procedures and
4. people.

Previous Next Close

### THE KEYBOARD



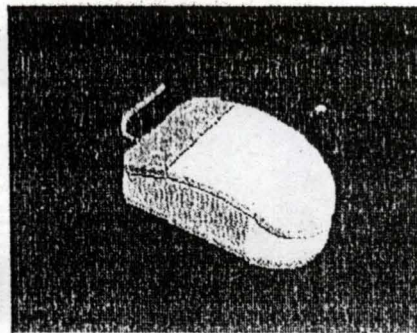
The Keyboard is an input device through which data entry is done and then passed on to the processing unit.

The parts of Keyboard as shown above are:

- 1 Alpha-numeric keys
- 2 Cursor moving arrows
- 3. Function keys 1-12 and
- 4 Numeric key pad

Previous | Next | Close

### THE MOUSE



The mouse is a pointing device used to position a cursor on the screen and to initiate actions without using the keyboard.

Previous | Next | Close

## TUTORIAL QUESTIONS

1) The computer system consist of (a) Hardware, Software, Procedures and People (b) Hardware, Light and furniture (c) Software, Hardware and People.

Enter the correct answer:

2) The hardware refers to: (a) The machine language (b) The physical components of the computer (c) The input and out devices

Enter the correct answer:

3) The four major activities of the computer are:

(a) Input, processing, storage and output (b) Procedures, storage, input and people (c) Output, input, people and processing

Enter the correct answer:

4) These activities also forms the: (a) Computer units (b) Computer output (c) Computer input.

Enter the correct answer:

5) The keyboard is (a) an output device (b) a storage unit (c) an input device

Enter the correct answer:

6) A device which reads printed written or photographic images and convert them into a digital form that a computer can understand is called

(a) Light pen (b) Mouse (c) Scanner

Enter the correct answer:

7) The major components of a keyboard are (a) The alphanumeric, functional, cursor/arrow and numeric keys

(b) Special, character and functional keys (c) The alphanumeric, functional and number keys.

Enter the correct answer:

8) Which of the following is considered as the brain of the computer (a) Central processing unit (b) Output unit (c) Storage unit

Enter the correct answer:

9) Which of the following is the safest storage (a) Primary storage (b) Secondary storage (c) Memory

Enter the correct answer:

10) ..... is an example of output unit (a) Printer (b) Scanner (c) Mouse

Enter the correct answer:

SCORE =

PROGRAM CODE

Private Sub Form\_Load()

End Sub

Private Sub Mn10\_Click()

Me.Hide

Form5.Show

End Sub

Private Sub Mn11\_Click()

Me.Hide

Form6.Show

End Sub

Private Sub Mn12\_Click()

Me.Hide

Form7.Show

End Sub

Private Sub Mn14\_Click()

Me.Hide

Form11.Show

End Sub

Private Sub Mn16\_Click()

Me.Hide

Form8.Show

End Sub

Private Sub Mn18\_Click()

End

End Sub

Private Sub Mn19\_Click()

Me.Hide

Form10.Show

End Sub

Private Sub Mn2\_Click()

Form1.Show

End Sub

Private Sub CmdNext\_Click()

Pic2.Cls

Pic2.Print " 1. Alpha-numeric keys: contain letters (alphabets A-Z) and numbers 0-9"

Pic2.Print " used for typing."

Pic2.Print " 2. Cursor/Arrows keys: they are four, usually blinks and indicates where"  
Pic2.Print " the next character typed will appear."

Pic2.Print " 3. Functional keys: F1-F10 or F1-F12 used for application packages "

Pic2.Print " 4. Numeric key pad and cursor movement keys: used for accounting work"

Pic2.Print " when the num lock indicator is on and off when it is for text."

End Sub

Private Sub CmdPrevious\_Click()

Pic2.Cls

Pic2.Print " The Keyboard is an input device through which data entry is done and "

Pic2.Print " then passed on to the processing unit."

Pic2.Print

Pic2.Print " The parts of Keyboard as shown above are:"

Pic2.Print " 1. Alpha-numeric keys"

Pic2.Print " 2. Cursor moving arrows"

Pic2.Print " 3. Functional keys F1-F10 or F1-F12 and "

Pic2.Print " 4. Numeric key pad"

End Sub

Private Sub Form\_Activate()

Pic2.Cls

Pic2.Print " The Keyboard is an input device through which data entry is done and "

Pic2.Print " then passed on to the processing unit."

Pic2.Print

Pic2.Print " The parts of Keyboard as shown above are:"

Pic2.Print " 1. Alpha-numeric keys"

Pic2.Print " 2. Cursor moving arrows"

Pic2.Print " 3. Function keys 1-12 and "

Pic2.Print " 4. Numeric key pad"

End Sub

Private Sub Form\_Load()

End Sub

Private Sub CmdClose\_Click()

```
Me.Hide  
Form1.Show
```

```
End Sub
```

```
Private Sub CmdNext_Click()
```

```
Pic2.Cls
```

```
Pic2.Print
```

```
Pic2.Print
```

```
Pic2.Print " PLOTTERS: Converts computer generated graphs charts"
```

```
Pic2.Print " and line drawings into high quality output on paper."
```

```
Pic2.Print " Plotters are usually used mainly by engineers and "
```

```
Pic2.Print " architects, for producing building plants."
```

```
End Sub
```

```
Private Sub CmdPrevious_Click()
```

```
Pic2.Cls
```

```
Pic2.Print
```

```
Pic2.Print
```

```
Pic2.Print " These present output on permanent form usually on a "
```

```
Pic2.Print " paper. They are also in different types and colours."
```

```
Pic2.Print " a) Laser Jet "
```

```
Pic2.Print " (b) Desk Jet "
```

```
Pic2.Print " (c) Dot matrix e.t.c."
```

```
End Sub
```

```
Private Sub Form_Activate()
```

```
Pic2.Cls
```

```
Pic2.Print
```

```
Pic2.Print
```

```
Pic2.Print " These present output on permanent form usually on a "
```

```
Pic2.Print " paper. They are also in different types and colours."
```

```
Pic2.Print " a) Laser Jet "
```

```
Pic2.Print " (b) Desk Jet "
```

```
Pic2.Print " (c) Dot matrix e.t.c."
```

```
End Sub
```