Digital Divide

The Concept of Digital Divide

The present age is referred to as a digital age. It is called a digital age because the current global economy is driven by a digital device known as the computer. The computer represents data and instructions in 0s and 1s called binary codes, hence, it is known as a digital device. One of the reasons of inventing the computer is to reduce the world to a global village. To achieve this, everyone most have access to a computer (mobile phone, laptop, etc.) and internet connectivity. But this is not the case. Some have full access to information and communication technology and some have little or no access at all. Hence, there is a digital gap or split between this two groups of people. This gap or split is called **Digital Divide**

Definition of Digital Divide

Digital divide refers to the gap between people with effective access to digital and information technology and those with very limited or no access at all. Digital Divide, or digital split, is a social issue referring to the differing amount of information between those who have access to the Internet and those who do not have access. The term became popular among concerned parties, such as scholars, policy makers, and advocacy groups, in the late 1990s.

Bridging the Digital Divide

The digital divide can be bridged. The very basic step would be to provide digital access to those in the community who do not have it. However, to be able to do so, countries would have to reduce the base price of gadgets or subsidize them.

The Old Economy versus the New Economy

Economy is the system by which the wealth of a given country or region is made.

Old Economy

In the old economy, investment in office and business information systems was relatively small. During this era (industrial era), increase in productivity was achieved by investing large amount of capital in physical plant facilities.

Features of the Old Economy

The old economy had the following characteristics.

1. Its processes were time consuming

2. It require a lot of labour

3. It was mechanically driven

4. It was constrained by time, space and distance.

The New Economy

Toward the end of the old era, the investment in computer increased, particularly as the transition from manual data processing systems to computer data processing system took place. The transition can be regarded as a shift from the old to the new economy.

Features of the New Economy

1. It is digital

2. Time, distance and space are irrelevant.

3. It is technology driven:

4. It is knowledge based

Limitations of Old Economy

The limitations of old economy to the new economy are:

Old Economy	**New Economy**
1. Slower and linear	1. Fast and unpredictable
2. Local competition	2. Global hyper competition
3. Automation and mechanization	3. Information and communication technology
4. Limited learning skills required	4. Continuous learning skills required
5. Capital intensive	5. Knowledge and people capabilities
6. Covers small area	6. Covers large area

Benefits of the New Economy

1. The size of equipment is reduced.

2. Business can start with small capital.

3. Creates new jobs

4. Attract new investment and encourage export

5. Greater competition.

Database

Definition of Database

1. A database is a collection of data organized in a manner that allows access, retrieval and uses of data.
2. A database is a collection of information that is organized so that it can easily be accessed, managed, and updated.
3. A database is an organized collection of data.

In a manual database, data can be recorded on paper and stored in a filing cabinet. While in a computerized database, it is stored in an electronic format on a storage media.

DBMS (Data Base Management System) is the application software that controls the data in the database. Examples of DBMS packages are: Dbase, Rbase, MS Access, Oracle, Paradox, SQL Server, SyBase, FOXPRO, IDMS, and System 2000.

Database Terminologies

1. Field: Field is a single piece of information about and object. A is also defined as a space that holds specific parts of data from a set or a record. Examples of fields are NAME, ADDRESS, QUANTITY, AGE, etc.
2. Record: A record is a collection of fields. It is the collection of information of a particular element, person or object.
3. File: This is the collection of related record
4. Database: Group of related record
5. Primary Key: a field in a table whose value is uniquely identifies each record in the table.

Forms of Database

1. Flat file: This type of database consists of table that is not complex to understand. This type of database can only handle single table database
2. Hierarchical Database: in this form of database, data are arranged or structured in form of a tree. . It can also be defined as a design that uses a one-to-many relationship for data elements. The data is stored as records are connected to one another through links
3. Network Model: This type of database allows the modeling of many-to-many relationship of data. In the network model of a database it is possible for a record to have multiple parents, making the system more flexible compared to the strict single parents of the hierarchical database.
4. Relational Model: A relational database is one that presents information in tables with rows and columns. Records are arranged in rows while fields are arranged in columns. Relational database is the most common type of database structure. It is used by most microcomputers Database Management System (DBMS) packages.

To start database in Microsoft Access, you do the following:

Step1: Click on the start button on the taskbar

Step 2: Move to all Programs,
Step 3: Click on MS Access

To open an existing Database, do the following:
Step 1: Click on file menu, then click open button
Step 2: Click on the file to be opened from the dialogue box.
Step 3: Then click on open or press enter on your keyboard.

Spreadsheets

Definition of Spreadsheet

1. A Spread sheet application is a large sheet having data and information arranged in rows and columns

2. Spreadsheet is application software that tracks, analyzes, and charts numeric information.
3. A spreadsheet is an interactive computer application program for organization, analysis and storage of data in tabular form
4. Spreadsheet is a computer program or software which allows calculation to be carried out on several cells that have numbers

Example of Spreadsheet
1. iWork Numbers – Apple Office Suite
2. Lotus 1-2-3
3. OpenOffice – Calc
4. Lotus Symphony – Spreadsheets
5. Microsoft Excel
6. VisiCalc

Application Areas of Spreadsheet
1. Accounting.
2. Statistical calculations.
3. Preparation of student results.
4. Obtaining tax estimation
5. Preparation of daily sales

Spreadsheet Terms and Features

1. Absolute Cell Reference: An absolute cell reference is one that does not change when it is copied. To make a cell reference absolute, you must include a $ before the reference (e,g C4).

2. Active Cell: The active cell is the cell in the spreadsheet that is currently selected for data entry. The active cell reference is listed in the Name Box directly above the spreadsheet's column headings.

3. Anchor Cell: The anchor cell is the first cell that is highlighted in a range. When a range of cells is selected, they appear as highlighted in black. The anchor

cell, however, remains white. If only one cell is selected in the sheet, it is the anchor cell.

4. Cell: A cell is a rectangular area formed by the intersection of a column and a row. Cells are identified by the Cell Name (or Reference, which is found by combining the Column Letter with the Row Number. For example the cell in Column "C" in Row "3" would be cell C3. Cells may contain Labels, Numbers, Formulas or Functions.

5. Cell Reference: A cell reference is the name of the cell that is found by combining the Column Letter with the Row Number. For example the cell in Column "C" in Row "3" would be cell C3.

6. Column: Columns run vertically on the spreadsheet screen. An Excel spreadsheet are labeled with the letters of the alphabet. When the column labels reach letter "Z" they continue on with AA, AB, AC..... AZ and then BA, BB, BC.....BZ etc.

7. Data: Data refers to the type of information that can be stored in the cells of a spreadsheet. Spreadsheet data types include values (numbers), labels, formulas and functions.

8. Formula: A formula is a spreadsheet data type that will calculate a result and display it in the active cell. A formula is written using cell references and must begin with an equal sign "=" to distinguish it from a label. An example of a formula would be:
=A3+C3 which would take whatever value was entered into cell A3 and add it to the value that was typed into C3. After typing the formula and pressing the Enter key, the resulting value will be displayed.

9. Formula Bar: The formula bar appears directly above the column headings of a spreadsheet and will display what has been typed into the active cell. For example, if you click on a cell that contains the formula =A3+C3, the cell itself will show the result of the formula. The formula bar, however, will display what has actually been typed into the cell which, in this case, is =A3+C3.

10. Function: Functions are built-in formulas that are used to enter either commonly used or very complex formulas. Like formulas, functions begin with an equal sign "=" and use cell references in their format. One commonly used function is the Sum function, which will add up the values in a range. The function: =sum(H2:H25) would add all values contained in cells H2 through H25 and return the result when the enter key is pressed.

11. Gridlines: Gridlines are the horizontal and vertical lines on the screen that separate cells in a spreadsheet. Gridlines typically do not print unless the option is set in the layout options of the spreadsheet.

12. Labels: Labels refer to text that is typed into the cells of a spreadsheet. Labels have no numeric value and cannot be used in a formula or function.

13. Name Box: The name box appears to the left of the formula bar and displays the name of the current cell. Unless you define a cell or range of cells with a specific name, the name box will display the cell reference of the active cell.

14. Print Area: The print area is used to specify a range of cells that will be printed, rather than printing an entire worksheet. This is particularly useful for very large worksheets with multiple columns and rows.

15. Range: A range is a group of cells in a spreadsheet that have been selected. If the cells are all together in a rectangular or square shape, it is an adjacent range. An adjacent range is identified by the cell reference in the upper left and lower right corners of the selection separated by a colon. (Example: A3:B5). In this example, the range would include all cells in the rectangular area formed by beginning the highlighting in cell A3 and dragging down to B5. You can consider the colon as the word "through". In this case, the range would include cells A3 through B5.

16. Relative Reference: A relative cell reference is one that changes when it is copied. For example, if a formula that contains the cell reference "C4" is copied to the next cell to the right, the reference will change to D4 (updating the column letter). If the same formula is copied down one cell, the reference will change to "C5" (updating the row number). The other type of reference is an Absolute Reference.

17. Rows: Rows run horizontally on the spreadsheet screen.

18. Sheet Tabs: In Microsoft Excel, the sheet tabs appear below the worksheet grid area and allow you to switch from one worksheet to another in a workbook.

19. Values: Values are numeric data that is entered into a cell. When data is formatted as the value type, it can be referred to in formulas and functions and used in calculations.

20. Workbook: A workbook is a collection of worksheets that are saved together in one file. Individual worksheets can be given descriptive names and you can switch from one worksheet to another by using the sheet tabs that appear beneath the worksheet grid area.

21. Worksheet: A worksheet is the grid of columns and rows that information is inputted into. In many spreadsheet applications (such as Microsoft Excel) one file -- called a workbook -- can contain several worksheets. Worksheets can be named using the sheet tabs of the bottom of the spreadsheet window. The sheet tabs can also be used to switch from one worksheet to another within a workbook.

Basic Operations in Worksheet

1. Starting Worksheet

To start a worksheet, the MS Excel will be loaded first to the screen of the computer. A workbook will be displayed automatically as the default file name book1

2. Data entry
This is the process of inputting data into the cells of the worksheet. There are three basic types of data in spreadsheet packages and they are:

a. Values or Numbers
b. Formula
c. Labels

3. Editing Worksheet
This is the process of customizing the worksheet so that it could ne neatly arranged on the pages when printing. Check spelling, preview layout, page setup and sheet setting, etc are parts of the editing process. The editing process gives the worksheet a befitting look.

4. Saving
This can easily be done using the Save As found on the file menu or by pressing ctrl + S keys simultaneously. A dialog box appears on your screen asking for the file name to be used and the location to save into.

5. Retrieving or Opening Worksheet
To retrieve or open a worksheet, click on office button on the menu and click on Open button form the file sub-menu or by pressing Ctrl + O keys together. A dialog box will be displayed asking you to choose the worksheet to be opened or retrieve.

Formatting Worksheet
a. Changing column width
i. Pull down the Format Menu and select Column and then width
ii. Type the desired width in the space provided

b. Changing Row Height

i. Pull down the Format Menu and select Column and then width
ii. Type the desired height in the space provided

Adding Formulae and Performing Calculations

To tell the spreadsheet package that you will be entering a formula, you must start the formula with a particular symbol. Excel uses the sign = and lotus 1-2-3, uses the @, - or + signs.

The operators used in spreadsheet formulae include

Addition +
Subtraction -
Multiplication *
Division /
Exponentiation ^

Using Functions in Microsoft Excel

Sum Function
The sum function adds up the total values of a group of cells, depending on which cells you choose. The general form is:
=SUM(First cell:Last cell)

Average Function
This will compute the average of the values of a group of cells depending on which cells you choose. The general form is:
=AVERAGE(First cell:Last cell)

Count Function
This function will count the number of entries in the range from first cell to last cells you choose. The general form is:
=COUNT(First cell:Last cell)

Max Function
The max function is used to find the largest value in a set of values in the row or column. The general form is:
=MAX(First cell:Last cell)

Min Function
The Min function is used to find the smallest value in a set of values in a row or column. The general form is:
=MIN(First cell:Last cell)

Printing Worksheet

Printing a worksheet is not much different from printing a word processing document. To Print a Worksheet Click on office button, select print from the menu or by pressing ctrl + P keys simultaneously.

Creating Graphs

MS Excel gives options of creating charts from data entries in your spreadsheets. Charts like line graph, histogram, pie charts and bar charts could be created from the supplied data basically numeric data.

There are different parts of chart namely:

a. Legend: In a chart or graph in spreadsheet programs such as Excel, the legend is most often located on the right hand side of the chart or graph and can sometimes be surrounded by a border. The legend is linked to the data being graphically displayed in the plot area of the chart

b. Axis: As in normal mathematical operations every chart must carry axis i.e. axis X and Y, where X and Y stands for horizontal and vertical lines respectively which are displayed on data scale

c. Data series: These are set of numbers in either row or column.

All charts are created in the same way by selecting range of cells within a worksheet called chart range after which one selects chart wizard option.

Computer Career Opportunities

Computer Professionals

Definition:

Computer professionals are the individuals that have obtained sufficient education and training in the field of computers and earn their livelihood from their chosen profession.

Computer professionals and their functions are discussed below.

S/N	COMPUTER PROFESSIONALS	DUTIES/FUNCTIONS
1	Database Administrator	1. Creates, updates and manages databases 2. Controls and implements database security, database recovery and control.
2	Systems Analyst	1. Carries out feasibility studies on systems and systems design 2. Recommends systems specification to the Programmer. 3. Liaise between the user and the Programmer
3	Programmer	1. Writes codes/instructions for the computer

4	Network Administrator	1. Sets up, oversees and coordinates the smooth functioning of the computer Network. 2. Provides network support services to the users.
5	Website Developers/Designers/Administrator	1. Designs, develops, updates and maintain Websites. 2. He is also responsible for website security
6	Computer Engineer	1. Provides Hardware specifications 2. Designs and develop systems programs 3. Computer troubleshooting

7	Computer Hardware Technician	1. Maintenance/repair of computers 2. Upgrading of computers 3. Setting up/installations of computers
8	Data Processing Manager	1. Plans, organizes, coordinates and reviews the activities of data processing staff
9	Computer Graphics artist	1. This is a professional who does all the complex art works such as drawing, painting, and animations with the computer.

10	Computer Instructor	1. This is a teacher that trains others on the science and application of computers
11	Computer-ware vendor	1. This is the person who sells computer hardware (hardware vendor) and software (Software vendor) to end user.
12	Computer Operator	1. This is the person that ensures continuous running of the computer system's processes 2. Distributes reports and backup data and other files regularly.

Qualities of a good computer professional

1. **Excellent Analytical Skills**

   Great computer professionals have excellent analytical skills that can be applied to solve problems or develop new ideas.

2. **An Attention to Detail**

   Computer personnel must pay close attention to detail to ensure everything works correctly and efficiently.

3. **Commitment to Learning**

   Technology is constantly changing, and those who keep abreast of the latest developments in information technology are the ones who will be the most successful.

4. **Good Communication Skills**

   The soft skills of verbal and written communication are increasingly important as non-techies rely on technological tools for their everyday business. Understanding a client's needs and the ability to meet those needs depend heavily on a steady stream of open communication.

5. **An Aptitude for Math**

   Strong math skills are necessary because math is used in many computer applications, such as when dealing with circuits or programming.

6. **An Ability to Handle Multitasking**

   People working with computers are often involved in many tasks at once and must be able to manage all of their responsibilities simultaneously. Time management skills and an ability to prioritize are assets as well.

7. **Solid Problem Solving/Troubleshooting Capabilities**

   Computer professionals are called upon to solve problems with networks, software, and other programs. They are expected to solve these problems very quickly, and having sharp troubleshooting skills most definitely is a benefit.

8. **Technical Writing Skills**

   Technical writing skills help a computer-savvy person explain complex concepts to those who have limited knowledge of the computer world.

9. **Versatility**

   The most successful computer professionals will be the ones who have skills that extend beyond information technology, such as skills in business and finance

10. He must have resting and relaxation time: A good computer must have a resting and relaxation time in order to relax and refresh the brain
11. He must belong to professional body

Computer Professional Bodies and their Functions

A professional body is a group of people who come together for professional and other mutual benefits and are governed by a constitution.

Some computer professional bodies and their functions are highlighted below.

1. Nigeria Computer society (NCS): www.ncs.or.ng

   This is a group of people interested in computing technology within Nigerian. They share ideas and knowledge and formulate policies that relate to ICT.

2. Institute of Management Information System (IMIS): www.imis.org.uk

   This is an internal body devoted to supporting and promoting the profession of information systems management.

3. Computer Professional Registration Council of Nigeria (CPN): www.cprcn.org

   This is a body responsible for the science and use of computer machines and techniques in the country.

4. Information Technology Association of Nigeria (ITAN): www.itan.org.ng

   This body provides professional services for IT bodies in Nigeria.

5. Nigeria Internet Group (NIG):

   It is a Non Governmental Organization (NGO) that promotes and facilitates full internet connectivity in Nigeria.

6. Nigeria Communication Commission (NCC):

   This body controls and regulates all communication operations in Nigeria.

7. Internet Service Provider Association of Nigeria (ISPAN):

   This body regulates and monitors Internet service operators in the country.

8. IT industry Association of Nigerian (ITIAN):

   The body controls the development of locally manufactured computer systems in Nigeria.

9. Association of Telecom Companies in Nigeria (ATCN): This body monitors and controls all telecom service operators in Nigeria.

10. Computer Association of Nigeria (COAN). This is a body that motivates and promotes Nigeria software developers and their products in the software industry.

COMPUTER VIRUS

Definition of Virus

1. A computer virus is a small software program that interferes with computer operation and spreads from one computer to another.
2. A virus is a self replicating program that copies itself and that can infect other programs by modifying them or their environment such that a call to an infected programs implies a call to a virus
3. Computer viruses are executable computer programs written by software developers to check piracy on some of their system and application software

The History of Computer Virus

Robert Thomas, an engineer at BBN Technologies developed the first known computer virus in the year 1971. The first virus was christened as the "Creeper" virus, and the experimental program carried out by Thomas infected mainframes on ARPANET (Advanced Research Projects Agency Network). The teletype message displayed on the screens read, "I'm the creeper: Catch me if you can." But the original wild computer virus, probably the first one to be tracked down in the history of computer viruses was "Elk Cloner." The Elk Cloner infected Apple II operating systems through floppy disks. The message displayed on infected Apple Computers was a humorous one. The virus was developed by Richard Skrenta, a teenager in the year 1982. Even though the computer viruses were designed as a prank, it also enlightened how a malicious program could be installed in a computer's memory and stop users from removing the program. It was Fred Cohen, who coined the term "computer virus" and it was after a year in 1983. The term came into being when he attempted to write an academic paper titled "Computer Viruses – Theory and Experiments" detailing about the malicious programs in his work.

Types of Computer Viruses

1. **Boot Sector Virus**: This type of virus infects the master boot record. It is challenging and a complex task to remove this virus and often requires the system to be formatted. Mostly it spreads through removable media.

2. **Direct Action Virus**: This is also called non-resident virus, when executed scans the disks for targets, infects them, and then exit (i.e. it does not remain in the memory after it is done executing).

3. **Resident Virus**: Resident virus installs itself as part of the operating system when executed, after which it remain in the RAM from the time the computer is booted up to when it is shut down.

4. **Multipartite Virus**: This type of virus spreads through multiple ways. It infects both the boot sector and executable files at the same time.

5. **Polymorphic Virus**: These types of viruses are difficult to identify with a traditional anti-virus program. This is because the polymorphic viruses alter its signature pattern whenever it replicates.

6. **Overwrite Virus**: This type of virus deletes all the files that it infects. The only possible mechanism to remove is to delete the infected files and the end-user has to lose all the contents in it. Identifying the overwrite virus is difficult as it spreads through emails.

7. **Space filler Virus**: This is also called “Cavity Viruses”. This is called so as they fill up the empty spaces between the codes and hence does not cause any damage to the file.

8. **Macro viruses:** As the name suggests, the macro viruses particularly target macro language commands in applications like Microsoft Word. The same is implied on other programs too.

Examples of Viruses

Some of the known viruses are:

a. Trojan horse virus

b. Sleeper

c. Logic bomb Alabama virus

d. Christmas virus

e. Jerusalem virus

f. Resident virus

g. Nonresident virus

h. Code Red

i. I love you

j. Creeper virus

k. Stone

l. November 17

Sources of Virus

These are the means through which viruses could be spread from one system to the other.

i. Infected memory devices
ii. E-mails attachments
iii. Internet downloads
iv. Computer network

v. Illegal duplication of software/cracked software

Virus warning signs

Some of the virus warning signs are listed below

i. Slowing down of response time
ii. Presence of tiny dots
iii. Wandering cursor across the screen
iv. Incomplete saving of file
v. Corruption of the system set-up instruction
vi. Appearance of strange characters
vii. Insufficient memory space in a hard disk when you have enough memory space

Virus Detection (Anti-Virus)

Anti-viruses are also written programs by software developers to stop and curb the spread of virus in a system. Antivirus software is a type of utility software used for scanning and removing viruses from your computer. Once an anti-virus is installed on a system, it will be hard for a virus to enter the system except if the antivirus is outdated. All antivirus can be updated on the internet.

Examples of antivirus are:

a. Norton Anti-virus
b. McAfee
c. AVG
d. Dr. Solomon's Tool Kit
e. Penicillin
f. Avast
g. Windows defender

Other Virus preventive measures include:

1. Timely update of operating system.
2. Timely update of antivirus software
3. Installation of only trusted or licensed software
4. Exercise care when browsing the internet

Internet Search Engines

A computer network consists of a collection of computers, printers and other equipment that are connected together so that they can communicate with each other. It is also *defined* as a group of two or more computer systems linked together.

Types of Network

1. Personal Area Network (PAN). It refers to interconnection of information technology devices or gadgets within the environment of an individual user typically within 10 meters.
2. Local Area Network (LAN). A local area network is a computer network covering a small local area, like a home, office, or school.
3. Metropolitan Area Network (MAN). MANs are large computer network usually spanning a large campus.
4. Wide Area Network (WAN). WAN is a computer network covering a broad geographical area.
5. Internet**.**
    i. The internet is a worldwide network of computers that share information.
    ii. The internet is a global telecommunication system that provides connectivity for millions of computers far and near.
    iii. Internet can also be referred as a system in which a group of independent computers are connected together either via a wireless or wires means to share common data.

Internet Search Engines

Search engines are websites or software that enables a person to find documents or other media on the internet. It can also be defined as software programs that help users find information stored on a personal computer, or a network of computer such as the internet. The information may consist of images, files, web addresses or links etc.

Internet Search Engine Terms

1. Search query**:** Also known as 'user search string', this is the word or set of words that are typed by the user in the search bar of the search engine.
2. Search Engine Results Page (SERP): A search engine results page (SERP) is the page displayed by a search engine in response to a query by a searcher. The main component of the SERP is the listing of results that are returned by the search engine in response to a keyword.

Some of the most popular web search engines and their addresses are:

SEARCH ENGINE	**WEB ADDRESS**
Google	www.google.com

Yahoo search	www.yahoo.com
Bing	www.bing.com
MSN live search	www.msn.com
AOL search	www.aol.com
Ask.com	www.ask.com
Mamma	www.mamma.com
WebCrawler	www.webcrawler.com
Infoseek	www.infoseek.com

Uses of Search engines

Search engines are often used to:

1. Find pages, files, news, images, and other data on the web
2. Download educational materials like lecture notes and tutorials in any subject of your choice
3. Download music and video
4. Get maps and direction
5. Display advertisements.