

CHAPTER 1: INFORMATION COMMUNICATION TECHNOLOGY AND YOU

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INTRODUCTION

The explosive growth of the computer and the dawn of the Internet era has loosely generated the term Information and Communication Technology. ICT has greatly impacted the way we do conduct our daily routines. At the forefront of ICT is the computer. Computers have come a long way from being a tool for scientist and the selected few to being a device that can be found in automobiles, the office and even in our homes.

OBJECTIVES

By the end of this chapter, you will be able to :

1. Describe the five parts of a computer based information system;
2. List down and describe the different types of computers;
3. Explain the information processing cycle;
4. Describe the characteristics and advantages of using computers; and
5. List down examples of computer use

1.1 COMPUTER BASED INFORMATION SYSTEM

Is computers an important technology? How is it being used in our daily lives?

In basic terms, a computer is an electronic device that processes data, converting it into information that is useful to people. Any computer, regardless of type, is controlled by programmed instructions which give the machine a purpose and tell it what to do.

By itself, a computer has no intelligence and is referred to as hardware, which means simply the physical equipment. The hardware cannot be used until it is connected to other elements, all of which constitute the five parts of a computer-based information system.

1. Hardware
2. Software

3. Data or information
4. People
5. Procedure

Software is the term to describe the instructions that tell the hardware how to perform its task. Without software, the hardware is useless. The primary purpose a computer is to transform data into information that can be used by people to make decisions, sell products and perform a variety of other things. Data can be considered as raw material – whether in paper, electronic or other form, that is processed by the computer.

Data consists of the raw facts and figures that are processed to become information.

Information is summarized data or otherwise called manipulated or processed data.

People constitute the most important component of a computer system. People are the ones who operate the computer hardware, they create and use the computer software, and they face ethical issues and decisions regarding the use of information technology. They enter the data and use the information generated by the system. They also follow certain procedures when using the hardware and software.

Procedures are descriptions of how things are done, steps for accomplishing a result. Procedures for a computer system appear in documentation manuals, also called user guides, which contain instructions, rules, and guidelines to follow when using hardware and software.

1.2 Types of computers

Computers come in all sizes, from large to small. It is more convenient to divide them into 2 categories: computers for individuals and computers for organizations.

Computers for individuals

Computers for individuals are mainly designed for one user at a time (Figure 1.1). They process and store smaller amounts of data and programs, such as research paper or a personal Web page. Examples are listed below:

- **Personal computer (PC)**
Also called a microcomputer, it is designed to meet the computing needs of an individual. The most commonly used types of personal computers are Apple's Macintosh systems and the more numerous IBM-compatible personal computers such as Dell, HP and Sony. These PCs are called "IBM-compatible" because the first such computer was made by IBM.
- **Desktop computer**
A desktop computer is a personal computer that was designed for use at a desk or in an office environment. They run programs to help individuals accomplish their work more productively or to gain access to the Internet.

- **Notebook computer**
A notebook computer is small enough to fit into a briefcase and is portable, because many people need a computer to travel with them. Many notebook computers are as powerful as desktop computers and include nearly all of a desktop computer's components such as speakers, CD-ROM drive and a modem.
- **Laptop computers**
Laptop computers are a like notebook computers except that they are a bit too large to fit into a briefcase.
- **Tablet PC**
Tablet PC is a type of notebook computer that has an LCD screen that the user can write on using special purpose pen or stylus. The user's handwriting is then converted into standard text through hand-writing recognition software or it can remain as handwritten text.
- **Personal Digital Assistants (PDAs)**
PDAs are sometimes called handheld computers, and they pack much of a notebooks power into a much lighter package and lower price. Most PDAs also include built-in software for scheduling appointments and sending and receiving emails.
- **All-in-one computers**
Apple's iMac are essentially a monitor with every else built in. the only external devices are the keyboard and mouse. The microprocessor, memory, storage and speakers are all contained in the monitor case.
- **Network computers (NCs) and internet appliances**
These computers were mainly designed to connect to a network such as the Internet. In the consumer market, NCs such as MSN TV enables consumers to use their televisions to connect to the Internet. Because they have limited memory, disk storage and processing power, NCs rely on computer networks for their power and software. However, these types of computers have since receded in popularity and usage.
- **Professional workstations**
They are powerful tools for engineers, architects, financial analysts and other professionals that need exceptionally powerful processing and output capabilities.



Figure 1.1: Examples of computer for individuals; clockwise : PDA, Desktop PC, Laptop PC, All-in-one PC

Computers for organizations

Computers for organizations are designed to meet the needs of many people concurrently (Figure 1.2). They process and store large amounts of data and more complex programs, such as all the research papers for every class on campus or the school's entire Web site. Computers can also be categorized by power (their processing speed) and purpose (the tasks they perform). Below are a few examples of computers for organizations:

- **Servers**

Servers are computers that make programs and data available to people who are connected to a computer network. They are not designed for individual use and are typically centralized or operated from one location. Users connect to the networks on clients, which can be in the form of desktops, laptops, workstations or any other computers designed for individual use, to contact the server and obtain the needed information. This use of remote or off-site clients and centralized servers is called client/server computing.

- **Minicomputers**
Minicomputers or often referred to as midrange servers, are midsize computers that handle the computing needs of a smaller organization or corporation. They enable hundreds or even thousands of users to connect to them simultaneously through PCs and terminals
- **Mainframes**
Mainframes are designed to handle huge processing jobs in large corporations or government agencies. Some mainframes are designed to be used by hundreds of thousands of people at the same time. People connect to mainframes using terminals or PCs. Mainframes are usually stored in special,secure rooms that have a controlled climate. They cost hundreds of thousands to millions of dollars and are very powerful.
- **Supercomputers**
Supercomputers are ultrafast computers that process large amounts of scientific data and then display the underlying patterns that have been discovered in the data. Usually they take a lot of space from a full room the size of two basketball courts to a room the size of four tennis courts. A supercomputer's price tag is also large – from one million to twenty million.



Figure 1.2: Examples of computers for organizations : Server, Supercomputer

1.3 Information processing cycle

The information processing cycle are the steps that the computer follow to receive data, process data according to instructions from a program,display the resulting information to the user and storing the results possibly for later use.

The information processing cycle has 5 parts, and each part involves one or more specific components of the computer:

- **Input**

During this part of the cycle, the computer accepts data from some source, such as the user or a program, for processing. Input devices enables you to enter data into the computer for processing. The most common input devices are the keyboard and mouse .Micropohones, disk drives and other devices such as scanners and digital cameras offer other ways of getting data into the computer.
- **Processing**

During this part of the cycle, the computer's processing components perform actions on the data, based on instructions from the user or a program. In this step, computers transform data into information. Information is data that have been simplified and organized in a way that people can use. During processing, the computer's central processing unit (CPU) or microprocessor (or just processor for short) performs operations on the input data. The processor is located within the computer system's case, also called the system unit. Because the CPU needs to handle multiple input/output requests at the same time, it uses memory chips to store program instructions and data. Thus, some kind of memory is needed. A typical computer includes several different types of memory, but the most important of these is the random access memory (RAM), which temporarily stores the programs and data with which the computer interacts.
- **Ouput**

Here, the computer may be required to display the results of its processing. For example, the results may appear as text, numbers or graphic on the computer's screen or as sounds from its speakers. The computer can also send output to a printer or transfers the output to another computer via a network or the Internet. Output is an optional step in the information processing cycle but may be ordered by the user or program.
- **Storage**

In this step, the computer permanently stores the results of its processing on a hard disk, tape or some other kind of storage medium like a CD-ROM and/or DVD-ROM. As with output, storage is an optional step and may not always be required by the user or program.
- **Communication**

Although communications has not been traditionally part of the information processing cycle, it can be considered as an additional step in the process. Communications involves moving data within the computer or between computers. To move data between computers, communications devices are needed. Communication devices enable computers to connect to a computer network. A network is a group of two or more computer systems connected together, usually for the purpose of sharing input/output devices and other resources.

1.4 Characteristics and advantages of computers

Computer characteristics?

There are 3 fundamental characteristics that make a computer the tool of choice nowadays. They are:

Speed

As we embark in our daily routines, the speed of getting the work done is getting more and more paramount. We expect quick and fast services when making telephone calls, asking for information, making bookings and etc, the speed executing these activities can be greatly enhanced with the use of computers.

Reliability

Computers are machines which do not tire. They are very dependable when executing a given task. Although some may argue this statement, often computers suffer a lack of reliability as a result of human error

Storage capacity

Nowadays, we often deal with huge amounts of data in our daily work. Business organizations like banks have to maintain their clients' information. With the use of computers, tremendous amounts of data can be safely stored and retrieved in various types of storage devices.

As a result from these characteristics, computers have given us the following:

Productivity

Productivity has been greatly enhanced thanks to the use of computers whereby more work can be done within a specific time as compared to not using a computer. As computers do not tire, they can be used and run 24 hours a day, 7 days a week and 365 days a year and still produced the desired output.

Decision making

Computers are machines that do not give in into emotions and based their outputs on logic. They are also capable in making numerous computations and processing. This will certainly help decision makers in making decisions that is fast, objective and just.

Cost reductions

By improving productivity and speed of decision making, computers can certainly reduce costs by minimizing the time and maximizing the output.

1.5 Examples of computer use

Computers in general have excelled in a number of areas. They are used extensively in these areas mainly because of the speed, accuracy and reliability that they offer. Below is a list of the more common areas of computer use:

- **Education**
People realize that education is the key to a person's success in life. The use of computers in education has greatly increased the easiness of delivering course content with the use of multimedia enriched presentations.
- **Money**
Computers and ICT have helped the banking sector in introducing internet banking which allows users to do their banking activities 24 hours a day (Figure 1.3). Computers also speed up transaction and record keeping and allow banks to offer same-day services.
- **Energy**
Computers are used extensively in the gas and oil industry. They are used to locate and identify gas, oil and other natural resources that exists which are often harder to locate using the conventional method. Electric companies meanwhile use portable handheld devices to record the amount of usage and charges.
- **Agriculture**
ICT and computer technology have helped farmers in the billing, feed combinations and market price checks. The use of machines which are usually controlled via computers also enhances their produce output.
- **Health and medicine**
Health is a very important area which utilize ICT and computer technology. Computers are used to help monitor patients in ICU units and are embedded in practically every machine and device that is used in hospitals such as the MRI scanner (Figure 1.4). Computers help in the diagnostic process and provide doctors with up to date, fast and reliable information on the patient's condition.
- **Training**
The use of computer-controlled flying simulators has helped potential pilots to learn the trade without the risk of crashing real aircrafts. The fast paced growth of ICT technology has enabled flight simulators to mimic real flight scenarios which not only saves costs, but also saves lives.



Figure 1.3: Internet banking



Figure 1.4: MRI scanner

SUMMARY

It is important to understand the term ICT and its importance in our daily lives. Computers are being used extensively in nearly every area like health, education and even agriculture. Computing skills have become an important skill to succeed in life and in work. It is therefore important to gain the necessary ICT and computing skills especially those which are relevant to your line of work.

GLOSSARY

- ICT - short for Information and Communication Technology which covers All forms of computer and communications equipment and software used to create, store, transmit, interpret and manipulate information in its various formats
- Multimedia - is media and content that utilizes a combination of different content forms. Multimedia includes a combination of text, audio, still images, animation, video, and interactivity content forms.

TEST 1

Instruction: Answer ALL the Questions within 15 minits.

1. Give the definition of a computer?
2. List down and describe the five parts of a computer based information system?
3. List down the different types of computers for individuals
4. List down the different types of computers for organizations
5. Give the definition of an information processing cycle

TEST 2

Instruction: Answer ALL the Questions within 30 minits.

- (a) How do the use of computers increase productivity?
- (b) List down and explain TWO(2) charateristics that make computers the tools of choice
- (c) List down and explain THREE (3) examples of computer use

REFERENCES

1. Butler, W., & Shallard, J. (2003). *A Journey of Discovery Through How Computers Work*: Pearson Education Australia.
2. Hutchinson, S., & Sawyer, S. (2000). *Computers, Communications, Information*: MCGraw-Hill.
3. Norton, P. (2006). *Introduction to Computers*: McGraw-Hill Technology Education.
4. Cashman, S. Cashman, J. Vermaat, M. (2007). *Discovering Computers 2008 : Complete*: Course Technology.