UNIT 3 COMPUTER APPLICATIONS IN GOVERNMENT, SCIENCE, ENGINEERING, TRANSPORT, COMMUNICATIONS, RECREATION AND THE MILITARY

CONTENTS

1.0 INTRODUCTION

This unit discusses in detail the application of computers in the following fields: science and engineering, health care, transport and communication, recreation, government and the military.

2.0 OBJECTIVE

At the end of this unit you should be to:

- mention and explain the application of computers in more areas of life than we have discussed before now.

3.0 MAIN CONTENT

3.1 Science and Engineering

Computers are commonly used to find accurate solutions to both scientific and engineering problems. Weather forecasting has now become a daily activity to which the

computer has proved very useful in providing information on the kind of weather we are likely to expect over a period of time. Such accurate predictions help the farmers, airline operators, navigators and other activities which depend on the weather for their operations. Computer aided critical path study is used to monitor the optimum and efficient use of time, money, material and human resources in the execution and implementation of projects. Such critical path study is used successfully in various projects, for example, the construction of roads, bridges, buildings, manufacturing, the conduct of elections and sales campaigns.

Another scientific application of in computer is the monitoring and simulation modelling techniques, to provide indicators as to how systems such as the human body, economy, weather, demographic variables and so on react to changes in situations. The application of simulation techniques helps in taking decisions and precautions in advance, in case there are repercussions help when the desired changes are introduced in practical situations. Computers also help to design buildings, roads, bridges, vehicles, aeroplanes, ships and complex architectural, works computer. Prototyping is increasingly being used in the construction of systems to minimise the financial losses in real life situations.

The computer is also used to find solutions to very complex mathematical and statistical computations at incredible speeds and accuracy. Furthermore, various software packages are now increasingly being developed to analyse surveyed data, construct live tables, perform mortality demographic and other multivariate data analysis designed to revolutionise scientific research and to find practical solutions to complex, challenging and everyday life situations. We now outline the use of the computer in the following specific areas, among others.

(i) Research Institutions

a) Evaluating, monitoring and controlling laboratory experiments.
b) Storing the readings obtained in laboratory experiments.
c) Standardising the readings obtained in laboratory experiments.
d) Tabulating or plotting the graph of the results obtained from laboratory experiments.
e) Interpreting the results obtained from laboratory experiments.
f) Modelling and simulating systems.
g) Developing the prototypes of systems.

(ii) Engineering and Architecture

a) Designing and drawing with very high precision, accuracy and at minimum cost.
b) Modelling and simulating the behaviour of engineering or architectural systems.
c) Developing the prototype of, say, an aircraft, a motor car, assembly plant and so on. It is possible to test and monitor the performance of these systems without serious financial commitments.
d) Fabricating, constructing and assembling the component parts of machines such as motor cars, aircraft and engineering plants without any hazards.

3.2.1 Marketing Departments

(a) Comparative analysis of products of two or more companies with a view to predicting some areas of improvement.
(b) Market survey, statistical analysis of proportional market gains and prediction of new market areas.
(c) Creation of consumer awareness and appreciation of products.

3.3 Agriculture

(a) Keeping records of soil, rainfall, weather conditions, land size, crops, and chemicals and ultimately processing the records to estimate soil fertility and yield per hectare over a number of years.
(b) Keeping records, of poultry and animal husbandry farm with a view to estimating the feed mix and environmental conditions desirable for optimal yield.
(c) Assessing the behaviour patterns of farmers in a cooperative venture, and assisting in matching the farmers that have identical behaviour with a view to optimizing their productivity.

3.4 Law and Justice

(a) Modelling and simulating legislative procedures.
(b) Indexing, storage and retrieval of law reports.
(c) Indexing, storage and retrieval of court proceedings.
(d) Assisting the human experts in crime investigation.
(e) Statistical analysis of criminal and civil cases in the law court and estimating the rate of growth.
(f) Assisting the court registrar in the allocation of cases to courts.
(g) Monitoring and evaluating congestion in police custody and prisons.
(h) Identifying the causes of crime and assisting with the provision of preventive and curative measures.

3.5 Health Care

The delivery of health care facilities has been one of the notable areas in which computer applications have proved most beneficial to mankind. The computer is used to conduct fast and accurate laboratory tests for blood, urine, stool and so on. The computer is used

in the diagnosis and physiological monitoring of patients' life during surgical operation and intensive care programmes. There is also a wide range of application packages for the scientific preparation and administration of drugs, x-ray techniques, blood bank management and so on. An equally important application of the computer is the computer simulation provided in the training of medical and paramedical staff and students.

Computers are being used to perform routine clerical functions in hospitals such as keeping records of hospital admission and discharges, administration of drugs and prescriptions and other hospital administrative functions. Furthermore, the computer is used to provide a data bank of medical history to meet the data needs of health insurance schemes and vital health care statistical reports.

The summary that can be drawn about the use of computers in hospitals is as follows:

(a) Keeping and reviewing in a timely, effective and efficient manner the records of patients, staff, drugs and equipment.
(b) Monitoring the temperature, blood pressure, heartbeat and a host of other parameters of patients, and raising the alarm when an abnormal situation is about to occur.
(c) Assisting medical practitioners in the diagnosis of patients' diseases.
(d) Assisting medical practitioners in the prescription of drugs to patients, and ultimately the treatment of patients.
(e) Assisting medical practioners in the monitoring, controlling and reviewing of basic health services, birth rate, death rate, and outbreak of disease and a host of others.

3.6 Transport and Communication

The most dramatic computer application is witnessed in the transport and communications sectors, with increased sophistication geared towards making life easier and safer for mankind. Today, mankind world-wide is linked by computer controlled orbiting communications satellites. Telecommunications and computing are today electronically linked together. As a result, information can now be transmitted around the globe on the radio, television, telex, facsimile and so on through microwave communication satellites.
Man's advancement in information technology has led to the development of the popular computer controlled electronic mail service which provides a more effective and efficient method of disseminating information to users in a computer network environment. The electronic mail service now provides faster, more convenient and cheaper electronic flow of information than telephone, fax and telex transmission.

Computer application in communications has led to the use of computer terminals at home. This development enables viewers to read electronic newspapers on television while the teletext provides computerised information to viewers on events around the

globe in the field of politics, business, transport, sports, airlines, hotel reservations and many others. The Cable News Network (CNN) is a practical example.

Computer application is now felt in traffic control and vehicle maintenance. Traffic congestion in cities is monitored by computer controlled traffic switching system which controls traffic flows. Computer aided input devices in the form of railcards or tickets are used to operate automatic gates in underground railway lines. When a ticket coated with magnetic stripes is slotted downwards into a device, the gate automatically opens for you to enter while you take your ticket. The device will return your ticket if it is valid for another journey; if not, it will keep the ticket and allow you to go. A passenger with an invalid ticket is given a red message and there is no way he or she can enter through the gate.

In the delivery of postal services, the computer is used to sort letters according to post codes. In the field of aeronautics, computer simulations are used to train pilots while air traffic movements are monitored by computer controlled radars. The scheduling of trains, subways, in real-time is also aided by sophisticated computer systems. Another important computer application is the introduction of computer devices to improve personal safety on aircraft and motor vehicles, and also to detect engine faults and help in the maintenance of aircraft and motor vehicles.

3.7 Government

The business of governance is serious business. In a multi-cultural, multilingual, multi-ethnic, setting such as Nigeria, a lot of complex and often conflicting variables interplay or are taken into consideration before a broad-based decision can be taken. Computers can assist government business in the following ways:

(a) Planning
(b) Decision marking
(c) Policy formulation
(d) Monitoring and control of operations

The availability of data, timely access to the data and timely reporting on the data are very crucial to the above listed business of government. Computers can be used to:

(a) Keep accurate records of government assets and periodically estimate the market value and insurance value.
(b) Keep accurate records of the population, behaviour patterns, and consumption patterns of utilities, and estimate the distribution of basic needs such as electricity, water, telephone and postal services.
(c) Keep records of government revenue and expenditure and assist government in monitoring, controlling and evaluating the revenue and expenditure.

(d) Keep records of government employees with a view to:

(i) Preventing ghost workers
(ii) Estimating the strength of the human resources of government
(iii) Producing statistical data on employees

(e) Issue identity cards to the citizens.
(f) Compile a broad-based and accurate voters register. This will check the incidence of ghost voting, multiple voting and other electoral malpractices, which have bedevilled the electoral processes and stable polity in third world countries.
(g) Keep track of crime in society, thereby helping government security agencies to check crime.
(h) Maintain the database of the mineral resources and other resources of the nation.

3.8 The Military

One of the areas in which the computer has been applied intensively and extensively is the military. The first generation of the modern computers were designed and used during the First and Second World Wars. The use of computers for processing data became more popular during these periods due to the need to procure, store and process large volumes of data. Over the years, the use of computers has transcended the traditional role of "crunching numbers" to sophisticated applications. Specifically, computers are being used in the following ways, in military operations:

- Training the personnel through the use of simulated war situations.
- Reconnaissance surveys.
- Automatic detection of mines.
- Monitoring and tracking of planes with a view to bringing down any unauthorised plane flying in the nation's airspace. Monitoring operations in the military base.
- Launching of missiles from distant military bases to the enemy territory. Such missiles are programmed to ensure that only the desired targets are hit.
- Manufacture of state-of-the-art military hardware and consumables.
- Communication and transmission of highly coded classified military information.
- Military games, adventures and expeditions.
- Keeping records of military personnel and logistics.
- Keeping records of military assets – hardware
- Management of military stock with a view to maintaining warready stock of materials, ammunition and assets at any point in time.
- Monitoring the environmental and storage conditions of lethar weapons in order to prevent accidents, like sudden explosions caused by improper storage.
- Generation and maintenance of necessary data that would enhance planning, policy formulation, decision making and forecast.

3.9 Recreation, Amusement and Gaming

One of the major areas in which the computer has affected society positively is in the area of recreation, amusement and gaming. "Allwork and no play makes Jack a dull boy". With increasing civilisation and urbanisation, there is the need for people to relax and keep their mind off the tension that is associated with daily activities.

Computer games help you to learn in private (even in the comfort of your own room or office), keep you off the streets and arcades, reduce tension and boredom, engage your mind with constructive things, and teach you new skills.
There are different kinds of games examples of which are adventure games, business games, war games, traditional games, and simulation games.

4.0 CONCLUSION

The computer, as a universal machine, is being applied to almost every area of human activity. The discussions in this unit here, hopefully, clearly demonstrate this assertion.

5.0 SUMMARY

In this unit, we have discussed in detail the application of computers in the following fields:

(a) Science and Engineering
(b) Health Care
(c) Business and Industry
(d) Transport and Communications
(e) Recreation
(f) Government
(g) The Military

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the roles of the computer in ensuring food security in Nigeria.

7.0 REFERENCES/FURTHER READING

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