



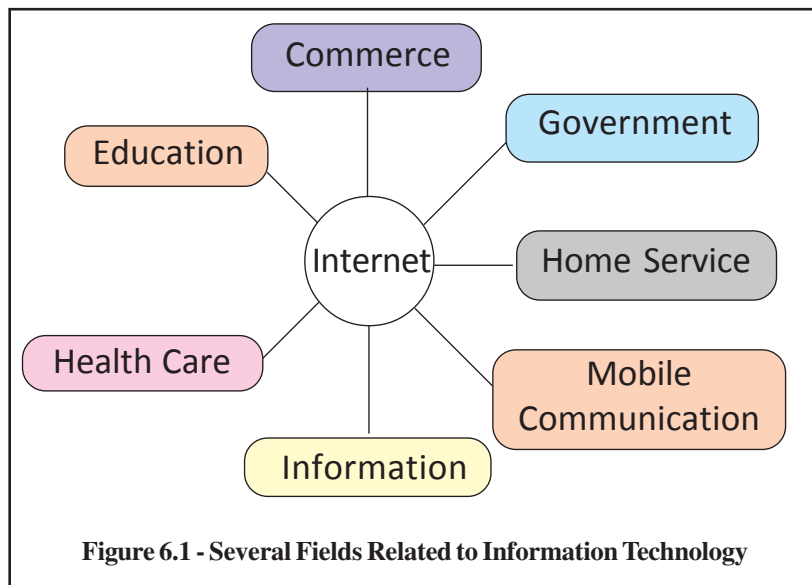
After studying this lesson, you will have better understanding of,

- Information Technology and Society
- Usage of information Technology

Society has stepped into a digital era consequent to information technology and communication technology. The service rendered by computer technology, communication technology and information technology in fulfilling numerous needs of society and providing required services by working hand in hand with the industrial sector and the manufacturers for more than half a century caused this change in the human society which dedicated itself to combining different sectors such as industrial, service supplying, communication, computer, media and recreational sector by using various tools is immensely benefited today. Though, at the beginning of the history, the computer was used only for converting data into information, today has become a technological era in which the computer is used in fulfilling various needs of society in numerous ways.

Paying much attention to the concept of computer network in collaboration with the progress in the field of communication and using all these on (information technology) the computer has become an essential item in present day society.

At present, connecting computers or computer devices related to the field of communication and by that means maintaining relationships among human beings living all over the world has become an essential daily need. This relationship is being used now in Telecommuting, Teleconferencing, Telebanking, Teleshopping, Telemeding, TeleEducation, E-mail, E-voicemail, SMS etc.



6.1 Use of Information Technology in the Field of Agriculture

There is a close relationship between Information Technology and the field of Agriculture today. The internet is used in exchanging information related to modern experiments done in the agricultural sector. In spite of exchanging information among Scientists, by creating a connection between agricultural producers and the market, information related to fluctuating prices is exchanged immediately. Therefore, the Agricultural sector is protected from inconveniences caused by mismanagements in the markets. Specially the farmers engaged in Agriculture are able to do direct transactions with salesmen through internet. It helps to prevent the farmers being exploited by intermediaries and their agro products are sold at a proper price.

Examples:

- Usage of internet and e-mail for various agricultural activities.
- Exchange of climatic data essential for Agriculture.
- Exchange of details related to prices of agro products.
- Creation of websites for exchanging information among scientists in the field of Agriculture.
- Computerizing the reports on payments / expenditure regarding agriculture.

In addition, information technology can be immensely useful in establishing Community Broadcasting Stations, Telecasting Stations as well as Community Service Centres. For example, the experimental project of Rays website Rays created by Kothmale Broadcasting Service can be cited.



6.2 Use of Information Technology in the Field of Industries

Computer technology as well as information technology is immensely used in the industrial sector. Making fundamental sketches / plans in creating various things and tools in the industrial sector, and previewing three dimensional pictures of products on the computer before they are actually produced, is done now. The objective is to create a preview of the end product by inserting various colours based on a fundamental sketch / plan on the computer. For example motor vehicle industry can be cited. In addition, the whole process of production can be regulated by using Robots controlled by computer systems and a flawless end product is assured.



6.3 Government Sector and the exchange of Information

Use, exchange and promoting information related to the government sector by people is an essential factor. Not only government documents, common (General) data and information, newspapers, gazettes, laws (rules and regulations) legal and information notices, but the services with national value are also computerized. People will be greatly benefited by them. People can obtain the needed information without visiting government offices. Instead, most matters can be inquired into through e-mail and other methods.

For example, the State (Government) Information Centre established in Sri Lanka by now can be cited. Anybody can obtain information or advice by dialing the telephone number 1919. Information can be obtained through websites maintained by Government Departments, Corporations or Boards of Establishment. Usage of data systems for the internal administration of the aforementioned institutes helps increase efficiency.



6.4 Information Technology and Business Community (Community of Entrepreneurs)

Information technology has invaded the field of businesses as in none other. Internet technology, which was not assisted by any entrepreneur long ago, is mostly used by the business world at present. There is no other sector as business in which computer technology is used from the process of production up to purchasing.

Using internet for trade transaction has resulted in great benefits not only economically but in administration also. One benefit is the possibility of importing goods from any country in the world after comparing the prices internationally and very often the possibility of purchasing goods at very low prices / costs. The website, www.amazon.com has become the largest market for books, newspapers, periodicals and magazines in the world. Hence, there is a shopping complex or a store named after 'Amazon' for that purpose. Moreover, any producer can make their products open to the international market through his website.

Everybody has accepted that doing trade transactions through internet is the safest and the most convenient way. Since the internet market is open 24 hours throughout the whole 7 days of the week and the year round, you can inquire about goods, exchange ideas and place orders for goods at any moment. Internet trading (internet shopping / e-shopping) is becoming popular day by day. You can compare prices of the goods ordered comparatively through internet, place orders on agreed prices and the possibility of paying via 'VISA / MASTER' cards.

Not only purchasing goods, but reserving flight tickets and hotels for your tours, sending presents to your friends and purchase of clothing for daily needs also can be done conveniently. But the only thing you cannot do in this manner is to fit on and select suitable clothing.



6.5 Information Technology and The Field of Health



With the expansion of the use of computer technology, much attention has been paid from the beginning on using it in the field of health. Computer technology is specially used in numerous medical experiments and tests. Today the computer is used from the production of medicine up to medical tests and for surgeries too. A considerable role is played by the computer in decision making in the field of health. Several such occasions are mentioned below.



Magnetic Resonance Imaging (MRI) Scanner

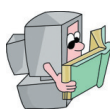
The 'MRI' Scanner provides photographs of internal human organs taken at different dimensions which can be focused on a computer screen or provided in printed form. Its importance is that doctors can take accurate decisions medically by using colour photographs of high quality provided by the MRI scanner than X-Ray pictures provided using 'X-Ray' technology. The ability to take close-up pictures of internal organs when required is very important, This method is exclusively used in diagnosing diseases related to sensitive organs such as the brain, heart and lungs.



Computer Axial Tomography (CAT) Scan

Three dimensional photographs using X-Ray technology are provided by the CAT scanner. This machine is very helpful in diagnosing the infections of internal body organs. Though the machine has the possibility of getting magnified pictures to diagnose incurable / fatal diseases, it has not been very much effective in diagnosing cancers at the initial stage.

It is important that this machine specially helps to diagnose infections caused in platelets and bone marrow. The photographs are created of a high quality and also with the use of more colours than of general usage in computers. Therefore, it helps in identifying very fine and precise differences.



EEG Technology

EEG or Electroencephalograph is an often used technology. It is used to detect malfunctions in the brain. Functions of the brain are graphed electronically and doctors are able to obtain information related to changes within a fraction of a second in a brain. Thereby, doctors can diagnose fatal / serious conditions in the brain. EEG technology is used in observing changes in brain functions while sleeping, walking or when the patient is unconscious or in an emergency.



Telemedicine

Usage of Information technology in examining and observing the patients, maintaining medical reports by doctors is called 'Telemedicine'. Irrespective of the venue where the doctor and the patient are, communication between two aforementioned parties can be carried on with the use of Internet or other nets. Thus the medical reports on different illnesses / sickness can be directed to the medical experts / consultants for further medical advice. This helps to preserve medical reports as well as providing the possibility of accessing them easily and conveniently when required. Not only does it improve the efficiency of medical service, it helps to eliminate the difficulty of preserving medical reports for patients also.

Educational functions in the field of medicine and health, administrative functions as well as experimental functions and specially clinical functions can be performed successfully using 'Telemedicine'. Exchanging of the information above can be done very quickly using e-mail. A close relationship can be built between the patient and the doctor using video electronic apparatus. Accordingly, the field of medicine has immensely benefited from pictures, animations moving figures as well as videos.

By today, 'Telemedicine' has become the mostly used technology in the field of medicine. Therefore, it has been able to maintain the hygienic condition of patients at a satisfactory level as well as to exchange numerous types of medical facts. It has

promoted high quality service in the field of medicine. The congestion in urban hospitals and clinics could be minimized because of the ability of examining and diagnosing the diseases in patients in regional hospitals by the consultants through ‘Telemedicine’.

However, unsolved legal and practical problems related to telemedicine still remain.



6.6 Use of Information Technology in the field of Education

Stepping beyond the traditional school education, Information Technology has been used in decentralizing education and promoting more educational opportunities for the students. Education which was confined to the classroom so far; has been expanded due to the influence of computer and internet: When there is no facility to access internet, electronically compiled educational programs can be made available to students via DVD or CD. Access can be made through LAN or Internet to facilitate education.

Education can be made available electronically in several ways.

1. Computer Based Training (CBT)
2. Web Based Training (WBT)
3. Learning Management System (LMS)
4. Distance Education System (DES)

The greatest advantage is that a large number of students are able to engage in education as they wish in getting education inside a classroom. Various problems arise related to space inside the classroom and the need to work according to a set timetable.

In getting education electronically, (through electronic media) students can select courses or sections of courses as they wish and access them. Following the courses or sections of them according to given guidelines can be done by an assessor by being present at a desirable place at a convenient time.

As the courses in the electronic education systems are designed using multimedia operations, students can gain great benefits out of them. The possibility of presenting many things which can't be expressed using words can be presented through motion pictures, moving pictures or video using multimedia technology at maximum level. These courses are now available in the market in CD and DVD with which the students with no access to internet can be benefited.

Electronic educational management systems can be used in management activities from registration of new students up to the Final Examination. Self educational exercise as well as guidance in improving the competencies of students can be controlled and managed through such systems. Registered students can access their advisors via e-mail in solving their problems and they can have the facility of contacting other students registered under the same subjects when required.

These assessments are done in several ways as follows.

1. Pre-Assessments
2. Intermediate Testing
3. Final Evaluation Test

In addition, various types of reports are prepared at the end of the course. The main facilities available in these systems are as follows.

1. Pre-Assesstment
2. Real Time progress Tracking
3. Customizable Group Reports
4. Simple Global Deployment
5. Time Management
6. Robust Management

School data management systems are used worldwide at present; and their functions have been greatly beneficial in school management. For example, school data management systems can be used in performing the functions mentioned below.

- ♣ Registration of students.
- ♣ Preparation of time tables and engagement of teachers in the work accordingly.
- ♣ Management of data for directing teachers for relief work when some teachers are on leave.
- ♣ Preparation and computerizing data on student attendance.
- ♣ Preparation and issuing of character certificates.
- ♣ Computerizing charges on courses and other activities involved in school management.

The best example which can be cited is the school network system called "School Net" active in Sri Lanka at present.

Threats in Computer Systems

Many different types of threats and influences can be noticed when a computer are in use. This section discusses the threats and influences caused due to computer software which affect the performance of the computers.

Generally computer software that poses a threat or influence on computer systems is called Malware or Malicious software. Some of the better known Malware types are given below;

- Computer viruses
- Worms
- Trojan Horse
- Spyware
- Adware
- Hijacker
- Dialer
- Spam

Computer viruses

What is computer virus?

A computer virus is a computer program that has the self replicating ability while residing in another computer program.

The main reason why these programs are called viruses is the fact that these computer programs, like biological viruses have the ability to replicate themselves and like bio-viruses that need a host for their existence, computer viruses too hide in a computer program to exist in.

How do viruses spread?

At present the main medium through which viruses spread is the Internet. Along with this, e-mail also contributes to the spread of viruses. And also storage media like floppy disk, compact disks, Digital Versatile disks, USB Pen Drives contribute directly the spread of viruses.

Further in the case of computer networks a virus in one computer is quite easily transmitted to another computer.

What can happen as a result of Virus Infection?

Virus can cause many damages to the computer system. Major ones are given below;

- Destruction of data and information stored in the computer.
- Corruption of data and information stored in the computer (They become unusable)
- Software installed in the computer becoming unusable. (As a result of the operating system becoming unusable, it becomes impossible to start up the computer)
- Efficiency of the computer drops.
- Hardware in the computer gets damaged rarely.

Other negative condition of virus infection is that computer users are put to a difficult situations resulting in the loss of their valuable time.

How is viral infection identified?

When a computer system is attacked by viruses, one or more of the following symptoms become evident. But one should be vigilant that these symptoms can be due to conditions other than virus infection.

- The computer might become slower than its normal speed.
- On certain occasions the computer fails frequently for no reason.
- For no reason the computer restarts often.
- Difficult to use certain software.
- Corruption of certain software.
- Certain software get deleted automatically form the computer system
- Files get automatically deleted.
- Addition of useless files
- Display of unnatural notices/messages on screen.
- Inability to install new software.
- Confusion in menus and dialogue boxes.
- Display of various images, icon on the screen
- Presence of various sounds.(unnecessarily)
- Inactivation of the disk drive
- Continuous activation of disk drives
- Printing becomes inaccurate.
- Printing of various kinds of junk malarial on printouts.
- Indications of absence of space on computer disk even where space does exist.
- Makes it impossible to start the computer.
- Takes an unusual amount of time to boot up the computer.

How is Virus Removed?

The best step that can be taken to remove viruses from computer is to use an updated anti-virus program. At present there is a large number of anti-virus programs available in the market. Some of them can be accessed through Internet free of charge. Below are several anti-virus programs.

Norton Anti Virus

McAfee Anti Virus

Sophos Anti Virus

Panda Anti Virus

AVG Anti Virus

Kaspersky Anti Virus

Avira Anti Virus

Avast Anti Virus

How to protect from Virus?

Since prevention is always better than cure, it is best to take action to prevent virus infection than taking remedial measures after infection.

The following steps can be taken, as suitable, in order to secure the computer system from virus infection.

Nevertheless, educating all computer users on how virus infection is caused and protective measures can be taken against such eventualities will contribute to the minimization of virus infection.

Short comings in software (especially in the operating system) facilitate the spread of virus and the incidence of destructive actions. It is necessary to update all the software and operating system regularly (installing service packs)

The following also can be done to prevent virus attacks;

- Firewall, kept active
- Maintenance of correct backup files.
- Security strategies in the antivirus program (Guard/shield/auto scan) are kept active.
- Avoiding use of administrative account for general purposes and using user account in its place.
- Use of original software, always.
- Avoiding entering unknown web sites.
- Paying greater attention to e-mail attachment received.
- Taking care in the use of storage devices attached from outside.
- Disabling the use of Macro facility in software.

Computer viruses are the mostly discussed malicious software. Very often other malware are also treated as Viruses. However, what we discussed above is valid for all types of malicious software that explained below. No detailed explanation is given separately for each one below.

Worms

Computer program with the capability of duplicating themselves without the intervention of human are called worms.

Although a host program is required normally for the existence of a virus, such a host is not necessary in the instance of worms. Worm exists as a file.

Since a worm, spreads quite rapidly in a computer network the damage caused can be quite high.

For free distribution

Trojan Horse

Computer programs called 'Trojan Horse' appear like useful programs but cause immense damage. (This name has been given based on the ancient Greek Story about the Trojan Horse)

Spyware

Computer programs that establish themselves in the computer and leak the information in the computer outside are called spyware software. Especially when carrying on activities where one is connected to internet these software can pass on to other computers (other individuals) information like the password of the computer, one's personal information (e-mail address) etc.

Adware

What happens here especially when browsing internet is the ceaseless display of unnecessary advertisement on the screen. Although nothing harmful happens as a result of this, the mental fatigue caused can be quite damaging for example, one's attention might be drawn to advertisements one never expected or even be prompted to pursue advertisements and go into their details at the expense of much, precious time.

Hijacker

In this instance action is taken by some other individual to access data and information in one's computer without the permission of the relevant owner of such information.

Dialer

Here some computer is directed to dial the number of a particular telephone. As a result not only has the owner of the telephone got to pay an unnecessary telephone bill but his telephone is also kept meaninglessly occupied. This is a task that can only be performed by computer that connects to internet by using a Dialer modem.

Spam

What happens here is the continuous flow of e-mail to one's email address. As a result of spam there is the possibility of an individual missing important e-mail received and has to waste much important time sorting out unnecessary mail from legitimate mail. Similarly another problem that spam creates is filling of one's e-mail account with unnecessary stuff making difficult the owner to manage his email account.

Antivirus programs are not capable to acting against all types of malicious software, successfully. Therefore, there are anti-malicious software prepared to act specially, against malicious software.

Malicious software	Software that act against them
Computer Viruses	Anti Virus
Worms	
Trojan Horse	
Spyware	Antispyware
Adware	Popup Blockers / AntiAdware
Hijacker	AntiHijacker
Dialer	AntiDialer
Spam	AntiSpam

Nevertheless, it is not possible to prevent the effect that the installation of such antimalicious can have on the efficiency of the computers.



Activity 6.1

1. If there is no antivirus program installed in your computer, describe the action taken to install a suitable one and how you went about it. (For this purpose it is better that you download an antivirus program available free on internet)
2. Update the antivirus program installed in your computer and describe briefly, step by step, how you went about it. You must indicate clearly the type of antivirus program you used.
3. Apart from the antivirus programs discussed above, prepare a list of other anti-malicious programs.



Activity 6.2

“Computer viruses (malicious software) shakes computer makers awake” conduct a debate on the above (or otherwise, give arguments for and against)



Activity 6.3

Who create computer viruses and why? Conduct an inquiry about this and prepare a brief report.

The computer and Health

Along with every profession there are risks confined to each. This chapter proposes to give a short introduction to the risks connected to computers.

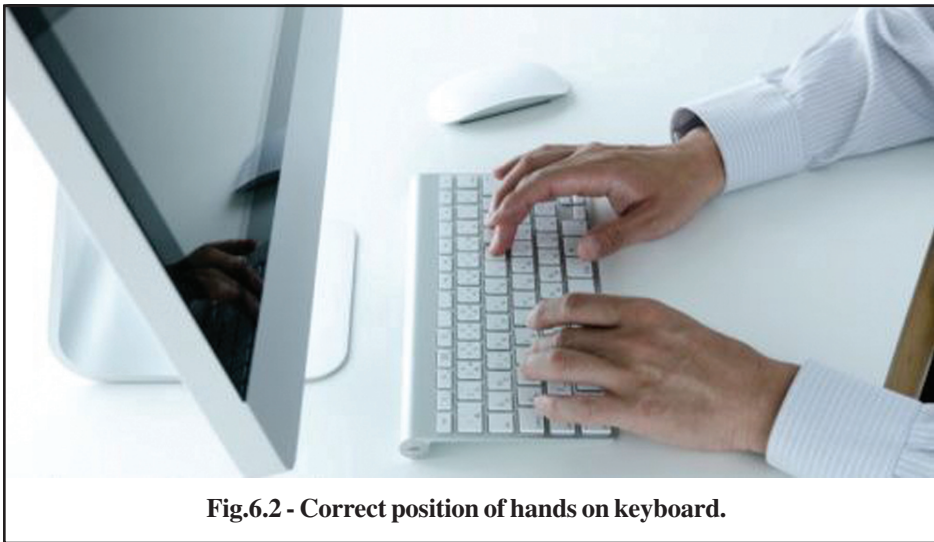
Possession of knowledge of what these risks are will help avoid most of them or to minimize their effect.

The study of mans physical activities involved with his profession is called ergonomics where “ergon” is the Greek form for “work” and “nomos” means law.

It is evident that a lot of steps have been taken to ensure that the safety of man in most of the accessories produced today. That is, in the creation of accessories today, it can be seen that they have been produced so as to perform the relevant task efficiently while ensuring man’s safety and health and providing him maximum comfort. Nevertheless, all these tasks are carried out as expected only if the relevant accessories are supplied in the required form and the instruction provided are followed correctly.

Repetitive Stress/Strain Injuries (RSI)

The physical pain occurs as a result of involving in the same task for a long period of time are called repetitive stress/strain injuries(RSI) . The commonest Repetitive Stress among computer users is the painful condition on the palm or wrist. This condition is called Carpel Tunnel Syndrome and while those working with the computer keyboard for long periods of time are subject to this condition, it is also aggravated by adopting the wrong posture when working.



Conformity to the instructions below on the use of keyboard and the mouse will help minimize to possible elements of risk involved.

- Use of keyboard and mice produced to health standards.
- Use of a support to rest wrist.
- Keeping palms and wrists straight when typing
- Taking a proper break. (This has been given in detail below.)

The next problem that computer users face is the painful condition of the back, especially pain of the spine and neck. The steps below can be taken to avoid them.

- The seat used
 - Should have the facility to adjust height.
 - Should have the facility at the back for one to lean against
 - Should contain adjustable arm supports.
 - While feet should be firmly placed on the floor when seated, there should be a foot rest when the seat has to be elevated
 - When seated, the back and neck should always be erect.
- Computer screen
 - Should be positioned at eye-level or slightly below.
 - Should be located 20-30 cm from the eye-level of the user.
 - Should be possible rotate up /down and left/right as necessary, and adjusted as necessary.
 - There should be facilities for the adjustment of “brightness” and “contrast” as required by user.

A condition quite common among computer users is eye-related problems. The most common eye-related conditions are as follows.

- Dry eyes
- Irritation of eyes
- Pain of the eyes
- Blurred vision
- Double Vision

Conditions like headaches are commonly related to the eye problems above.

The points discussed above under the “Computer Screen” will help minimize conditions related to eyes.

Along with these it is best that one takes eye- exercises. They are :-

- Directing one’s sight objects positioned at various distances, from time to time.
- Blinking of eyes from time to time
- Ensuring that the level humidity of the environment is maintained at a suitable level

These conditions of the eyes resulting from computer use are called computer vision syndrome (CVS)

A factor that merits some consideration computer use is the need to take some rest from work. What is meant by this is not that one should work continuously for a long period of time and then take rest a long period of time. It is best that one works for short spells and rest intermittently for short spells.

Along with this, since the positioning of the computer can pose a risk to the computer user, this too needs to be given a certain amount of consideration.

- Unprotected electric cables drawn at random.
- Use of unmatched tables and chairs.
- Unsystematic lighting. Failure of lights to be positioned correctly.
- Absence of sound humidity control.
- Failure to take necessary steps for correct manipulation of certain accessories. (Eg: Failure to remove properly the toner in the printer)

The illustration below gives the correct posture to be adopted in using the computer.

