

Unit 2 : Office Automation Tools and Technology

Introduction

Office automation applies a variety of technologies to increase office productivity. The technologies in the automated office have made and continue to make substantial changes in the conduct of many standard office functions. In this unit we look at office automation innovations including reprographics, e-mail, e-filing, facsimile transmission, micrographics, teleconferencing, video conferencing, computerized teleconferencing. Office automation tools include geographically separate word processors, electronic printer, OCR, dictation unit, optical page reader, standard typewriter, PABX, facsimile devices, and other equipment that communicate with one another and with remote computer systems via telecommunication and data communication links.

Lesson 1 : Telecommunication and Word Processor

Learning Objectives

On completion of this lesson you will be able to:

- define telecommunication and word processor
- distinguish between word processing and data processing
- describe optical character reader (OCR), photocopying machine and electronic printer
- know the advantages of word processor over a standard electronic type writer.



Telecommunications

The transmission and reception of signals, writing, sounds, intelligence of any nature are possible by wire, radio, light beam or any other electronic means. Computer communication takes place via computer networks. Computerized telecommunication allows rapid information exchange to geographically distant sites. Data stored physically in one location may be accessed or utilized instantly and simultaneously at numerous other locations. Modern telecommunication techniques provide improved information exchange and more management control over dispersed parts of an office or organization. A local area network (LAN) is a communication system that links together the devices located in a small area such as an office building or a campus. A local area network uses special coaxial or fiber optic cables with appropriate

The transmission & reception of signals, writing, sounds, intelligence of any nature-by wire, radio, light beam or any other electronic means.

interface units and belongs to the using organization. The transmission speed is very high and it is possible to connect together terminals, word processors and computers of different vendors. A LAN can integrate word processing and data processing and help optimize the use of costly resources such as storage devices and printers. It is also possible to link two LANs through a long- distance transmission line.



Difference Between Word processing and Data Processing

How word processing differs from data processing is as follows :

Word processing	Data processing
1. Done mostly on words	1. Done mostly on numerical data.
2. Word manipulation and formatting is performed flexibly.	2. Data manipulation requires careful formatting.
3. It is a qualitative process.	3. It is a qualitative process.
4. Errors are relatively easy to locate.	4. Errors are more difficult to locate.
5. Word processing concentrates on preparation of documents such as letters and reports.	5. Data processing is concerned with performing tasks associated with applications such as payroll, inventory control, accounts payable/receivable etc.

Word processing and data processing



Word Processor

Word processing involves the production of letters, reports and other documents by means of electronic equipment. Once the material has been entered into this equipment it can easily be modified or corrected and additions or deletions can be made without retyping the original document.

Word processing is the process of transforming ideas into written communication quickly and accurately through the use of computer technology. The process includes creation, manipulation, storage, retrieval and printing of texts. It requires trained people and a set of office procedures to do the job effectively.

The production of letters, reports and other documents by means of electronic equipment.

The basic components of a word processing system is shown in Fig. 2.1.

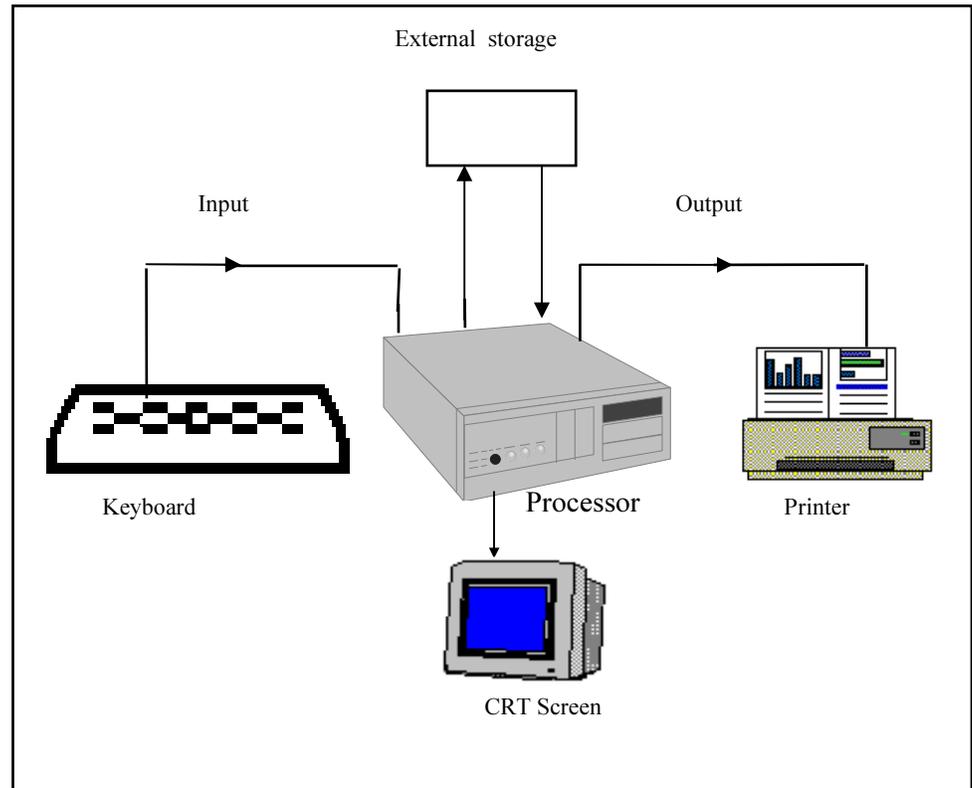


Fig. 2.1: The basic components of a word processing system.



Optical Character Reader

Optical Character Reader (OCR) is the direct reading and conversion of typed or handwritten characters into computer readable form.

Optical character readers are input devices that are used to read any printed text. They can interpret handmade marks, handwritten characters, machine printed characters and special symbols and codes. In other words, optical character reader (OCR) is the direct reading and conversion of typed or handwritten characters into computer readable form. Say, for instance, as secretary uses a conventional typewriter to type a list of employee names on a sheet of paper. He or she then places the paper into a feeder bin on an OCR device, which reads the list directly into the computer system without manual intervention and without the need for magnetic ink.

The steps in an OCR system are to prepare the document, read it, recognize characters, edit and format output, and finally output the results directly to the I/O channels or to an off-line computer tape or disk.

OCR devices have been in commercial production since the 1960s. They have become more popular in recent years as prices have dropped significantly.

OCRs scan the text optically character by character, convert them into a machine-readable code and store the text on the systems storage medium. They can read at a rate of up to 2,400 characters per second. This makes it possible for offices to reduce the input keying bottle-neck. OCR devices are expensive and are used only when there are large quantities of documents to be keyed-in. Other advantages of using an OCR are :

Advantage of OCR

- It can be used to reformat preprinted or pre-typed documents by inputting through the reader and outputting on the systems printer
- It can be used to consolidate texts from various documents into one document
- It can serve as a link between the word processing system and the conventional typewriter.

Since OCR eliminates human element in data entry, it improves data accuracy and timeliness of output. However, if the document is poorly prepared, it can create difficulties.

OCR applications include the following :

OCR application

- Banking : OCR reads check-information, either as the principal data input device or as a secondary device for checks rejected by magnetic ink character recognition equipment.
- Retail operations : OCR is used most commonly for reading bar code symbols on products in supermarkets, department stores, and other retail firms.
- Processing of credit card forms : Some large credit card issuers such as oil companies, which process millions of receipts forwarded from retail operations daily, use OCR equipment to read these receipts.
- Newspapers : Newspaper stories and advertising copy typed in draft form can be input directly to the computer by OCR devices. (In some cases editors and reporters type copy directly into a terminal without draft copies; OCR is unnecessary here.)
- Government : OCR equipment is used to read census information and portions of the massive volume of tax records into government computer systems.

- School districts : School districts often use OCR to read typed or hand printed data on student performance, attendance, schedules, and course selections.
- Word-processing functions : Because an OCR device can read typed and/ or hand printed documents, it may be part of a word-processing system, or it may be connected to a standard computer system. In the latter case, once a document is read in, it is processed by a text editor or other text-processing software.



Photocopying Machines

Photocopying machines are fast replacing the duplicators. Photocopiers do not require the preparation of a master. They are simple to use and do not require any training to operate.

Photocopying Machines

Photocopiers can produce copies in the range of 15 to 50 copies per minute automatically. The original may be a sheet, a page of a book or a 3-dimensional object. Some models can produce copies with reduction or enlargement. This is useful for producing multiple copies of large size computer outputs. We can also use "cut and paste" technique in preparing originals. Most photocopiers have the following features.

- Automatic paper feeding
- Provision for feeding different sizes of paper
- Copy selector to set for a specified number
- Copy counter.

Photocopiers are also available with attachments that can collate, staple, and stack copied documents. Copiers that can produce copies in colour are also available in the market.



Electronic Typewriters

It is a simplified word processor offering a limited set of functions, often including automatic centering, tabulation of decimal numbers, insert and delete, and search and replace. It usually lacks a full viewing screen, so the typist must print out the text to see it. It stores 200 or fewer pages in its memory.

Electronic typewriters

The *advantages of a stand alone word-processor over an electronic typewriter* is as follows :

Advantages of electronic typewriter.

- inserting text and deleting text,
- spacing, searching for and replacing portions of text,

Office Automation and MS Office

- text scrolling (moving in any direction, text that will not all fit on the screen to view select portions); text arrangement (formatting with automatic centering, margins, pagination etc.),
- moving blocks of text from one location to another; production of form letters or standard documents.

The following figure shows an electronic typewriter (Fig. 2.2)

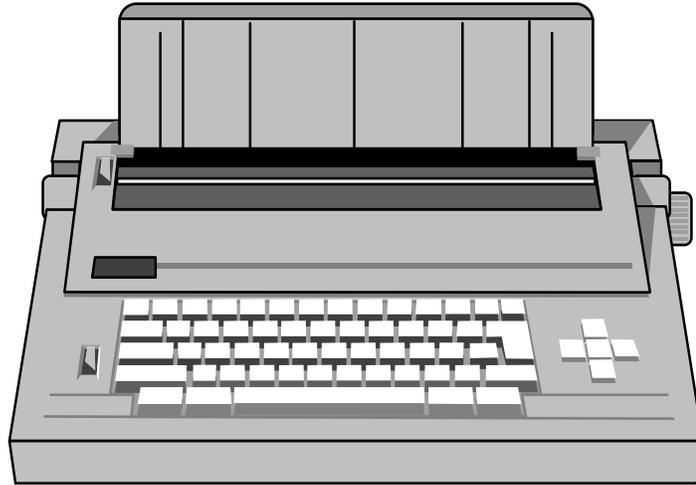


Fig 2.2 Electronic typewriter.

Exercise

I. Multiple choice questions

a. Data processing is done mostly on

- i) words
- ii) numerical data
- iii) letters
- iv) logical data.

b. Errors are relatively easy to locate in

- i) data processing
- ii) word processing
- iii) centralized processing
- iv) decentralized processing.

c. A local Area Network (LAN) is a communication system that links together the devices located in a

- i) large area
- ii) very large area
- iii) small area
- iv) wide large area.

d. Optical character readers (OCRs) scan the text optically

- i) word by word
- ii) page by page
- iii) character by character
- iv) sentence by sentence.

e. OCRs can read at a rate up to

- i) 400 characters per second
- ii) 1400 characters per second
- iii) 2400 characters per second
- iv) 2400 characters per minutes.

f. Automatic paper feeding and copy counter are the features of

- i) photocopiers
- ii) OCRs
- iii) electronic printer
- iv) duplicators.

g. An electronic typewriter can store

- i) 100 or fewer pages in its main memory
- ii) 200 or fewer pages in its main memory
- iii) 300 or fewer pages in its main memory
- iv) 400 or fewer pages in its main memory.

2. Analytical questions

- a) What do you know about word processor and telecommunication ?
- b) What are the advantages of a word processor over an standard electronic type writer?
- c) Point out some of the advantages of OCRs.
- d) What are the features of a photocopier ?
- e) Compare Word Processing with Data Processing.

Lesson 2 : WP Hardware Configuration

Learning Objectives

On completion of this lesson you will be able to :

- discuss different word processor Hardware configuration
- point out some of the advantages of shared-logic systems over multiple stand-alone systems
- identify the advantages and disadvantages of time-sharing systems.



WP Hardware Configuration

A word processor consists of the following five hardware components :

- keyboard
- processor
- memory
- visual display
- printer.

Its technology is fast changing in terms of both performance and cost. Depending on the work flow, office structure and people, one can select a particular configuration of these parts. The most common word processor hardware configurations are :

- Stand-alone systems
- Shared-logic systems
- Shared-resource systems
- Distributed-logic systems
- Time-sharing systems.

Word processor hardware configurations

Stand-alone System

A stand alone system is a self contained, single terminal systems located at one place with its own CPU, a CRT terminal, a keyboard, peripheral storage device and a printer. Since stand-alone systems are independent of other units in the office, these are relatively easy to implement in the office environment. They cost less and are most suitable for small offices. When the user's requirements exceed the capacity of one system, a second one can be added independently of the first.

A stand alone system is a self contained, single terminal systems located at one place with its own CPU, a CRT terminal, a keyboard, peripheral storage device & a printer.

Shared-Logic Systems

Shared-logic system is a word processing system that allows more than one user to work simultaneously.

A shared-logic system is composed of a central unit - including a processing unit (CPU) a CRT terminal, disk storage device (s), and printer (s) - and one or more remote CRT terminals for input/editing.

While two or more independent stand-alone systems increase reliability and flexibility of operations, storage and speed of these individual systems may not be adequate to meet certain applications. In such situation, a larger computer (usually a mini-computer) is used as a central processor and a number of keyboards with display screens are used as terminals. These remote CRT terminals do not have their own processing and storage capabilities but share the logic and storage sections of the central processor. Such terminals are often referred to as "dumb" or "non-intelligent" terminals. Fig. 2.3 illustrates a typical shared logic system that shares not only the processor and storage but also the printers.

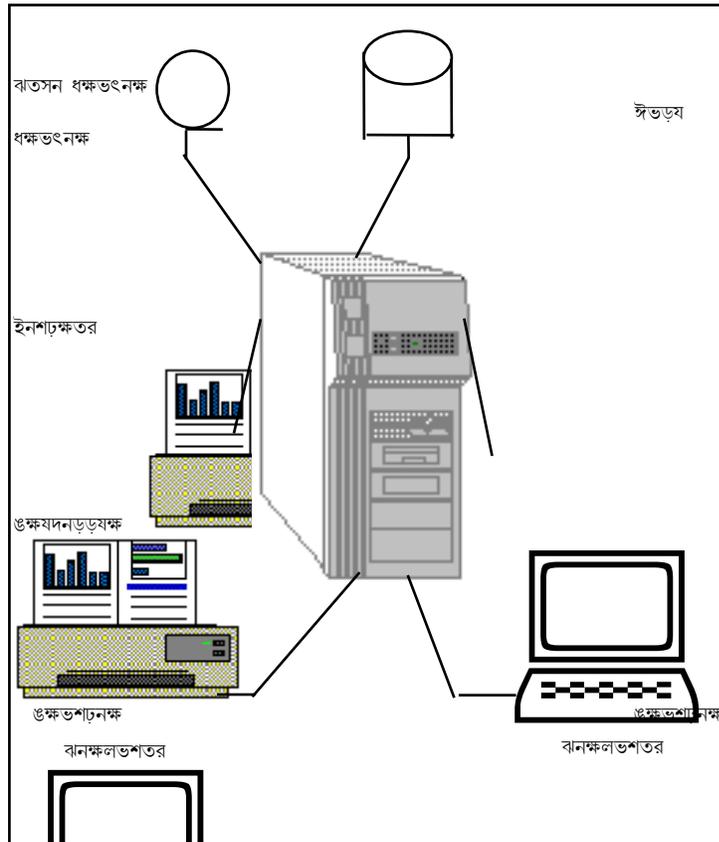


Fig. 2.3: Shared-logic system.

Office Automation Tools and Technology

The shared-logic systems possess the following advantages over multiple stand-alone systems :

Advantages of shared-logic system

- A shared-logic system is more economical. This is due to relatively low-cost dumb terminals. When load increases, an additional dumb terminal can be added without the need to duplicate the entire range of components
- A centralized processor is more powerful and more sophisticated than individual internal processing units.
- Since a shared-logic system usually shares an external storage unit also, it is possible for many people to work simultaneously on a single document stored in the external storage.

However, the central processing unit has got two major drawbacks.

- Its failure leads to the failure of the entire system,
- Its response-time degrades as more terminals are added to it.

Shared- Resource Systems

This is a cluster of two or more small word processing systems with their own processors and floppy drives that share certain costly components such as printers and hard disks.

Another kind of configuration that is commonly used in large offices is the "shared-resource" or "shared facility system". This is a cluster of two or more small word processing systems with their own processors and floppy drives that share certain costly components such as printers and hard disks. This also ensures the optimum use of printers and hard disks which might otherwise be under utilized. The printers of stand-alone systems are idle much of the time while the operators are busy with other tasks.

A configuration using shared-printer is shown in Fig. 2.4

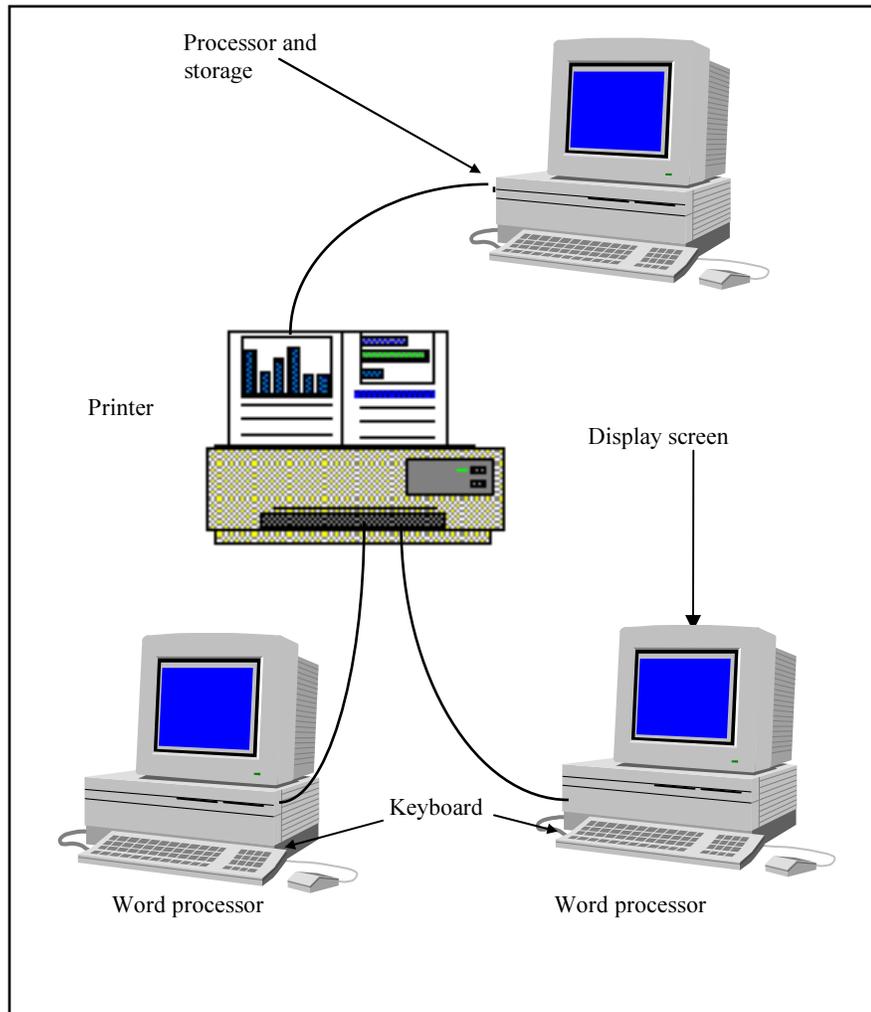


Fig. 2.4: Shared-resource word processor system.

Each word processor has been connected to the central printer via a switching system. Text can be transmitted to the printer with the help of software controls.

Distributed-Logic Systems

One of the major disadvantage of a shared-logic system is that if the central processor fails for any reason, all the terminals (dumb) are also down. This situation could be avoided if some processing capabilities are distributed among the terminals. This would enable many of the simple functions to be achieved on individual systems themselves.

Distributed- logic systems

A simplified illustration of a distributed-logic system is shown in the following Fig. 2.5. The system is basically similar to the shared-logic system except that the terminals in this case are intelligent. The distributed-logic system provides better response time and higher reliability of operations.

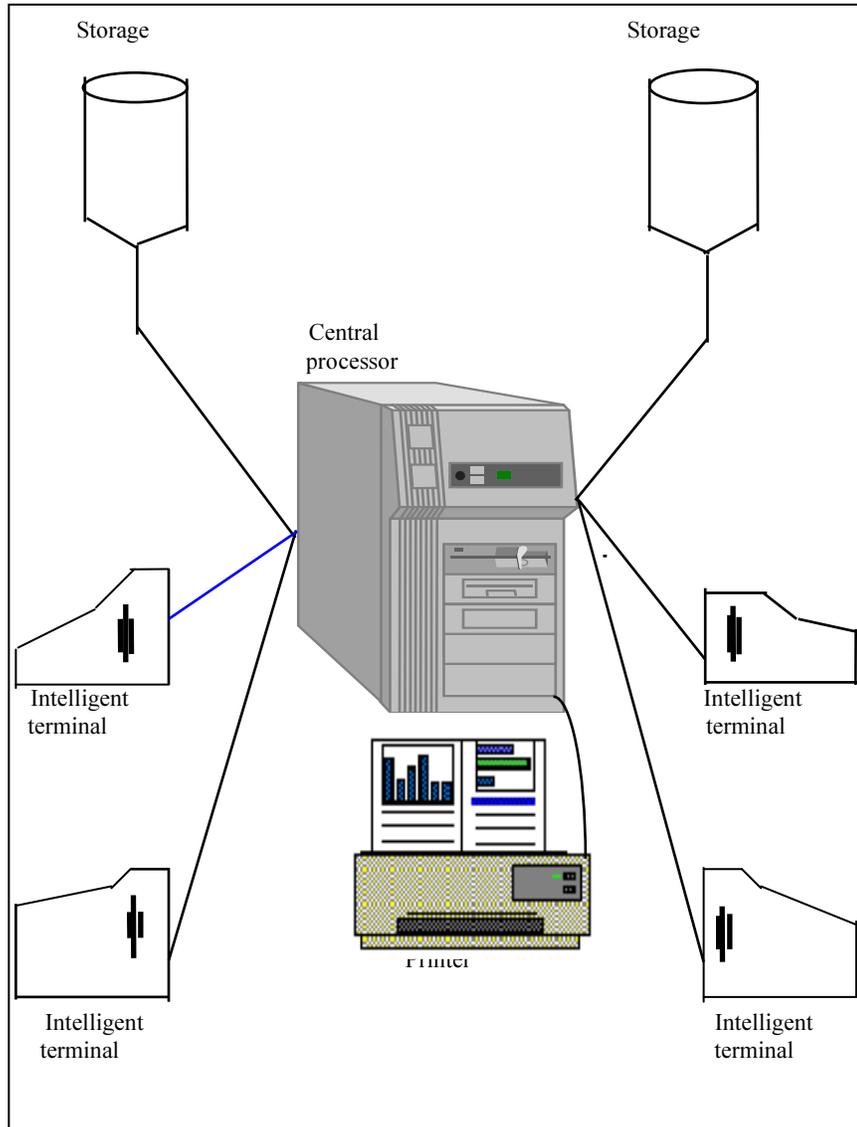


Fig. 2.5: Distributed-logic system.

Dumb terminal is a terminal that does not have a microprocessor to control various terminal tasks.

Dumb/non-intelligent terminal : A terminal that does not have a microprocessor to control various terminal tasks. In contrast, an intelligent terminal might allow word processing functions to be done utilizing the power of the terminal and not the CPU.

Intelligent terminal contain its own processor and memory.

Intelligent terminal : A terminal containing own processor and memory. See dumb terminal.

Time Sharing Systems

Time Sharing Systems

Many organizations might have already installed large computers for data processing and maintaining data bases. These organizations may take another approach to word processing. They can add extra keyboard terminals and additional software to the existing main computer in time-sharing mode. This is similar to the shared-logic system except that the central processor is used for data processing also. A few advantages expected from a time-sharing system are :

- Terminals can be added at very little extra cost
- The power of the main system is available for word processing,
- Terminals can make use of the files already residing in the computer's storage in preparing reports and documents.

Such terminals may be installed any where in the organization and can be used to communicate with each other. However, this approach has some drawbacks :

- Since the total system is not dedicated to word processing, the priority assigned to word processor activity may be low. In such cases, the word processor operators may be required to wait in line.
- Terminals are less "user friendly". That is, the users of terminals must follow certain procedures for using the central computer.
- The printers used for data processing applications are of poor quality. However, this can be overcome by installing a letter quality printer for word processing service.

Exercise

1. Multiple choice questions

- a. A word processor consist of
- i) 2 hardware components
 - ii) 3 hardware components
 - iii) 4 hardware components
 - iv) 5 hardware components.
- b. Which of the following hardware configurations are relatively easy to implement in the office environment.
- i) shared-logic systems
 - ii) stand-alone systems
 - iii) shared-resource systems
 - iv) time-sharing systems.
- c. Better response time and higher reliability of operations are provided by
- i) shared-resource systems
 - ii) shared-logic systems
 - iii) distributed-logic system
 - iv) time-sharing system.
- d. A terminal containing own processor and memory is called
- i) dumb terminal
 - ii) intelligent terminal
 - iii) virtual terminal
 - iv) CRT terminal.

2. Analytical questions

- a. Describe stand-alone and shared-resource systems.
- b. Point out some of the advantages of shared-logic system over multiple stand-alone system.
- c. What are the drawbacks of a shared-logic system ?
- d. Describe the advantage and disadvantages of time sharing systems.
- e. What do you mean by a dumb terminal and intelligent terminal?

Lesson 3 : Reprographics

Learning Objectives

On completion of this lesson you will be able to learn :

- what is reprographics
- the related technology that make-up reprographics.



Reprographics

Reprographics

A group of technologies such as photo-composition, phototypesetting and electronic printing/intelligent copying are used for the rapid printing and copying of the output of office automation systems. Fig. 2.6 illustrates this fact.

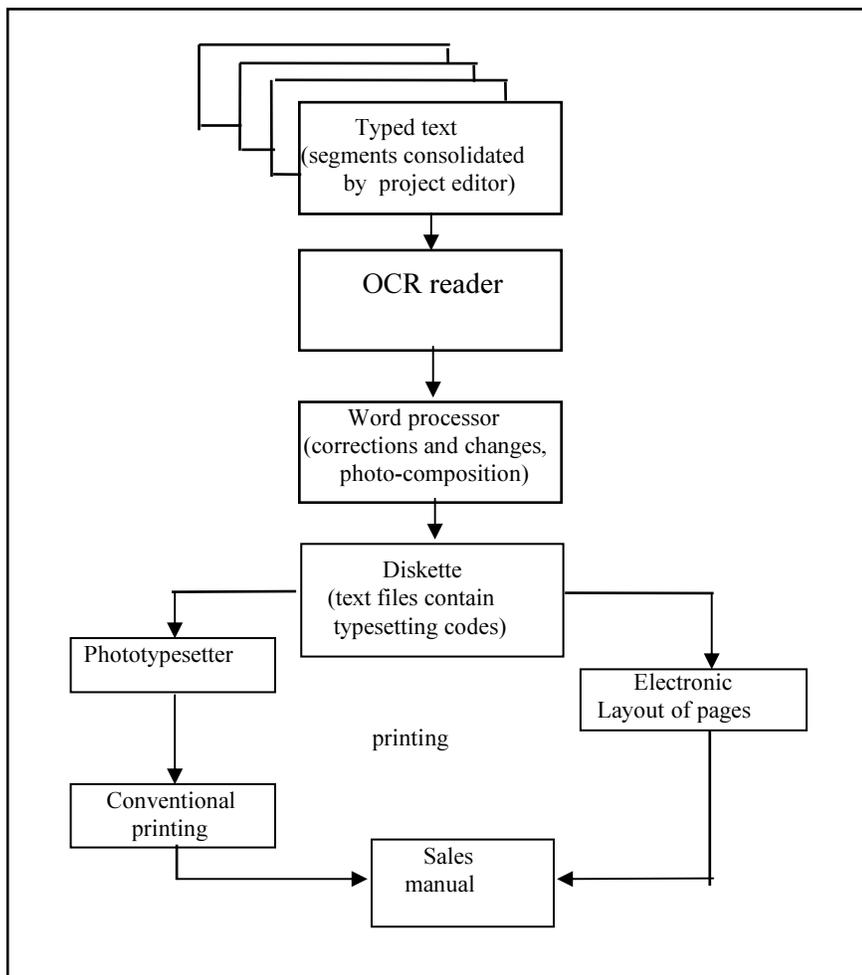


Fig. 2.6: Reprographics technologies used in creating a sales manual.

Photo-composition

Photo-composition is the process of creating documents for reproduction by means of photographic characters onto film.

Printing a written document first involves photo-composition of text. Photo-composition is the process of giving a series of typesetting commands regarding character size, font, indentation, and tabulation; special characters; design and placement of graphics. In other words, creating documents for reproduction by means of photographic characters onto film. Photo-composition commands can be incorporated into an ordinary word-processing file. The file is then either directly transmitted to a photo typesetter electronically or transported on disk.

Phototypesetting

Phototypesetting is a photographic process that imprints a document onto a printing plate.

The next step in producing a printed document is photo typesetting. At first, we have to know what type setting is. *Typesetting* is the process of creating high quality letter forms. Phototypesetting is a photographic process that imprints a document onto a printing plate. Photo typesetting was invented in the 1920s. The advantage of word-processing photo-composition plus phototypesetting include saving in time and money since they eliminate the need to go outside to produce typeset copy. In addition, the resulting copy is neater in appearance and holds about twice as much information per page, which also is an advantage on distribution and mailing cost.

Electronic Printer

An electronic printer is a multiple-use device that can print directly from word processing files; transmit, receive & print electronic mail.

The final step in producing a printed document is the actual printing itself. An electronic printer is a multiple-use device that can print directly from word processing files; transmit, receive and print electronic mail; print computer output remotely; perform standard photocopying. Electronic printers usually copy and print at medium speeds (35 to 50 pages per minute), produce medium quality printed text and is very expensive.

Exercise

1. Multiple choice questions

a. Creating documents for reproduction by means of photographic characters onto film is called

- i) phototypesetting
- ii) photo-composition
- iii) electronic printing
- iv) electronic filing.

b. Phototypesetting was invented in the

- i) 1900s
- ii) 1905s
- iii) 1910s
- iv) 1920s.

c. An electronic printer usually copy and print

- i) 5 to 15 pages per minute
- ii) 15 to 20 pages per minute
- iii) 35 to 50 pages per minute
- iv) 35 to 50 pages per second.

2. Analytical questions

- a. What are the related technologies that make up reprographics? Describe in brief.
- b. What are the functions of an electronic printer?

Lesson 4 : Electronic Mail and Electronic-Filing

Learning Objectives

On completion of this lesson you will be able to :

- describe major advantages of electronic-mail (e-mail) over conventional communications
- know what e-mail is
- know about basic aspects of an e-mail system and its advanced features
- know what electronic-filing is
- find out the advantages of electronic-filing over conventional filing.



Electronic Mail

Electronic mail is a system that delivers messages at electronic speed. In an organization with this capability, employees can send and receive messages over long distance in minutes or seconds. Electronic mail (e-mail) is a system which allows messages to be sent between computers. A message can be sent either to an individual or to any number of individuals who have access to the same network. In recent years, e-mail systems have been used increasingly to improve the timeliness, control and effectiveness of communication in modern offices, e-mail system has occupied a pivotal place in modern information technology. It has brought revolutionized changes in official/organizational communication and is significantly replacing the traditional communication media. It has brought cognitive, affective and behavioral impact upon the members of office. Interdepartmental integration and coordination within the office is greatly facilitated by computer-based communication system. In any office, e-mail is an effective means of communicating with right person at the right time.

Electronic mail is a system that delivers messages at electronic speed.

One major advantage of e-mail over the telephone is that receiving party does not have to be present to receive the mail; the message is stored for future retrieval. Other advantages are as follows :

Advantages of e-mail

- One to many communication is simple and easily achievable
- Using e-mail, people can work at home or travel while maintaining needed contact with their peers, superiors and subordinates
- It is very fast
- A message can be sent to many people at once
- It also leaves a written copy of messages that can be filed away or forwarded.

E-mail is convenience to busy executives, who are often pressed for time but need to communicate efficiently.

Early forms of e-mail include telex, telegrams and mailgrams. The current technology is in two areas, networks of communicating word processors and computerized message switching (CMS). Word processors may be interconnected through telecommunication links which allow word processing files to be transmitted to remote locations. In this case, word processors serve as a part of e-mail system.

In **CMS (Computerized Message Switching)** system electronic messages are sent over a computer network from a sender's standard CRT to a recipient's computer where they may be read immediately on a CRT or stored.

CMS

Communicating Word processor is a stand alone word processor that is linked to another stand alone (a shared system) or a large computer through communications links.



Basic Aspects of e-mail

Basic aspects of e-mail

Let us now briefly describe some basic aspects and services of an e-mail system.

Composition

It refers to the process of creating messages and answers-e.g. when answering a message, the mail system can extract the originator's address from incoming mail and automatically inserts it into the proper place in the reply.

Transfer

It refers to moving messages from the originator to the recipient. The mail system should do this completely automatically, without bothering the user.

Reporting

Reporting has to do with telling the originator what happened to the message. Was it delivered? Was it rejected? Was it lost?

Conversion

It may be necessary to make message suitable for display on the recipient's terminal or printer.

Formatting

It pertains to the form of displayed message on the recipient's terminal. If the input file were to be transmitted by e-mail it would have to be reformatted at the receiving end to give it desired appearance.

Decomposition

It is the final step and concern what the recipients does with the message after receiving it. Possibilities include throwing it away immediately, reading it first then throwing it away, read it then saving it and so on.

In addition to these basic services, an e-mail system generally provide a large variety of advanced features. Let us briefly mention a few of these.

Advanced features of e-mail

- When the people move or when they are away for some period of time. They may want their mail forwarded so the system should be able to do this automatically.
- If some one has decided to take a vacation for a few weeks, he may not want his mail forwarded. Instead, he may want the mail system to send a canned reply to the originator of each incoming message saying that he is away and telling when he will return.
- Most mail systems allow users to create mailboxes to store incoming mail.
- When a message is sent to the distribution list (a list of e-mail addresses), identical copies are delivered to every one on the list.
- Registered mail is another idea to allow the originator to know that his message has arrived. Alternatively, automatic notification of undeliverable mail may be desired.
- Other advanced features are carbon copies, high priority mail, secret encrypted mail, alternative recipients if primary one is not available and the ability for secretaries to handle their boss's mail.



Electronic Filing

Electronic Filing

Electronic filing is a technology for entering and storing documents for retrieval in the future. The major advantages of electronic filing over conventional filing are that the physical space demands are reduced and retrieval is more rapid, systematic, well-indexed or orderly.

The use of electronic filing is as follows :

Uses of electronic filing

- The first use is to access and display customer information to reply customer inquiries.
- Another use in correspondence files, where the indexing system allows ready review of selected portions of correspondence e.g. all memos written to a particular individual during a specified time period.

Exercise

1. *Multiple choice questions*

- a. Electronic mail is a system that delivers messages at
- i) typing speed
 - ii) printing speed
 - iii) electronic speed
 - iv) processing speed.
- b. One major advantage of e-mail over telephone is that
- i) sending party does not have to be present
 - ii) receiving party does not have to be present
 - iii) receiving and sending party does not have to be present
 - iv) both party have to be present.
- c. Registered mail is an idea to allow the originator to know that
- i) his message has not arrived
 - ii) his message has arrived
 - iii) his message has been received
 - iv) his message has been sent.
- d. What do you mean by CMS ?
- i) Central Message System
 - ii) Computerized Message Switching
 - iii) Central Message Switching
 - iv) Computerized multi-tasking System.

2. *Analytical questions*

- a. What is the main advantages of e-mail over conventional communication?
- b. Point out the advantages of e-filing over conventional-filing.
- c. What are the basic aspects of e-mail system? Briefly describe.
- d. What do you understand by electronic filing ? Point out some of the uses of electronic filing.

Lesson 5 : Facsimile Transmission and Micrographics

Learning Objectives

On completion of this lesson you will be able to :

- know what facsimile transmission is
- describe different types of facsimile system and their uses
- describe micrographics.



Facsimile Transmission

Facsimile transmission is a technique that records an electronic picture of an entire page of a document on a facsimile unit and transmits it to another facsimile terminal at a remote location.

Facsimile transmission is a technique that records an electronic picture of an entire page of a document on a facsimile unit and transmits it to another facsimile terminal at a remote location. Most often the user establishes a network connection between a facsimile transmitter and receiver by telephone dialing. Facsimile systems use synchronized scanning at the transmitter and receiver ends. The original document is placed around a drum in the facsimile machine and scanned line by line. The resulting electrical signals are transmitted over telecommunications line to the distant receiving stations. Here they are duplicated either on paper or film. This system enables a precise reproduction of the original document. There are two kinds of facsimile systems, namely analog and digital.

Analog System

In an analog system, the scanner moves across the document reading every part of it and each scanned element is converted into an electrical signal.

Analog system

Digital System

In a digital system, the scanner reads only the part that contains information and does not read blank spaces. The images are converted into short, binary signals (in series of pulses). Digital facsimiles are much faster than analog systems.

Digital system

Facsimile are used to transmit high resolution graphical images such as photograph and signatures. So facsimile machines are distinct from other automated technologies in that they provide exact, and high resolution reproduction. There are two types of facsimile equipment.

Facsimile equipment

- Convenience unit: It is capable of sending a business letter in about one minute and it can also receive incoming documents.
- Central unit: It functions at higher speeds, transmitting a business letter in less than 30 seconds, can often send and receive documents automatically i.e. without operator intervention.

Uses of facsimile

Some common uses of facsimile are the transmission of military and law enforcement communications, sales orders, business contracts, engineering drawings, internal memos, news photos, weather information (such as transmitting weather maps to ships and planes) and graphics. It may also be used for medical purposes, e.g. for cancers treatment at a group of geographically dispersed hospitals.

The use of facsimile is not new. However, computer-linked facsimile networks are new and are playing an important role in office automation.



Micrographics

Micrographics is the production, storage and retrieval of miniaturized information on films, referred to as microfilms.

Micrographics is the production, storage and retrieval of miniaturized information on films, referred to as microfilms. In the automated office, it serves a variety of functions and is integrated with many other technologies.

In other words, micrographics refers to the technology by which images of text are photographically reduced and stored on films. The processed outputs are often called "microforms". Large volume of information can be stored in a relatively small area. Microform readers can be used to display the information (for reading) as well as to produce printed outputs. Two kinds of microforms are popular: microfilm and microfiche. A microfilm is a continuous roll of film, either 16 mm or 35 mm. Microfiche is a sheet of film, usually 4 inches by 6 inches. The number of pages of text that can be stored in each frame of microfilm or in a microfiche depends on the degree of reduction. The reduced images are arranged in sequence in case of microfilm and in the form of rows and columns in case of microfiche as shown in Fig. 2.7.

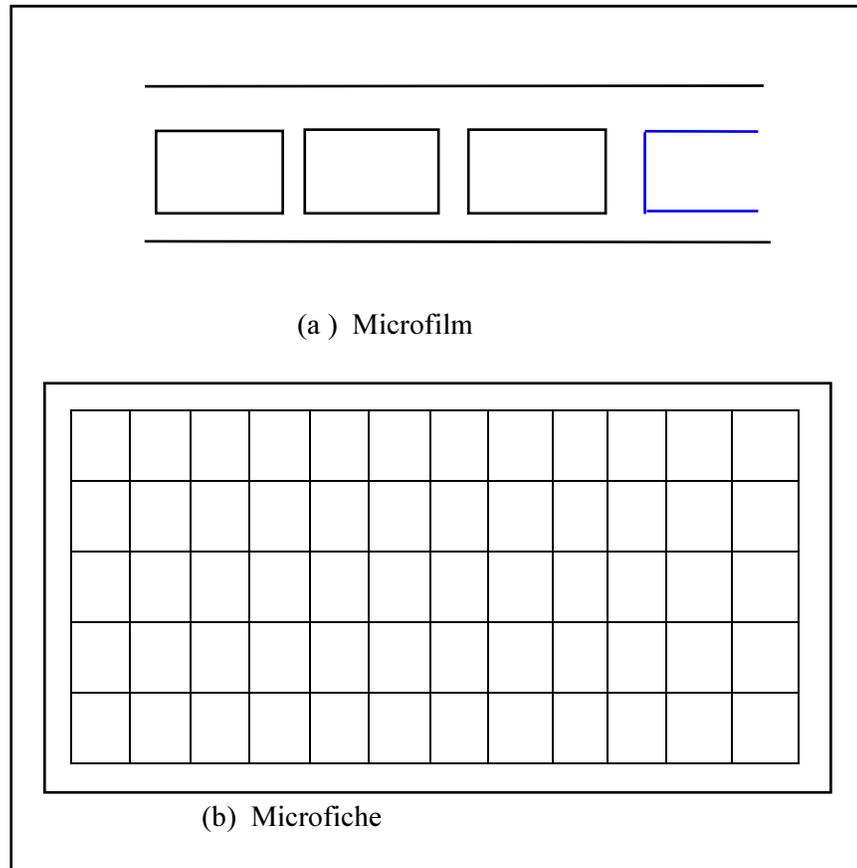


Fig. 2.7 : Arrangement of microimages.

A more recent equipment is the computer output microfilm (COM). A computer output microfilm equipment integrates computer and microfilm technologies. A document is read (or keyed) into the computer and a microfilm recorder receives the output information either directly from the computer (on-line mode) or through a tape drive (off-line mode) shown in Fig. 2.8.

The recorder displays the information as characters on a screen. A high speed camera takes a picture of the displayed information. The film is processed either in the recorder itself or in a separate automatic film developer. The COM recorder thus becomes an alternate to paper printer as a way of producing output. Film may be in the form of roll or microfiche. Film duplicators can be used to make as many copies of the developed film as needed.

The information on a film or microfiche is read by users using microfilm viewing devices either manually or with the help of a computer. In the computer assisted retrieval (CAR) the user can simply ask for a

particular page and the computer finds it and displays it on the screen. If the paper copy of the document is needed, a reader-printer is used to provide printed outputs.

Although the initial cost of such equipment is very high, the cost of film is relatively cheaper and the system provide relatively fast output. A single COM recorder can produce an output of roughly ten line printers.

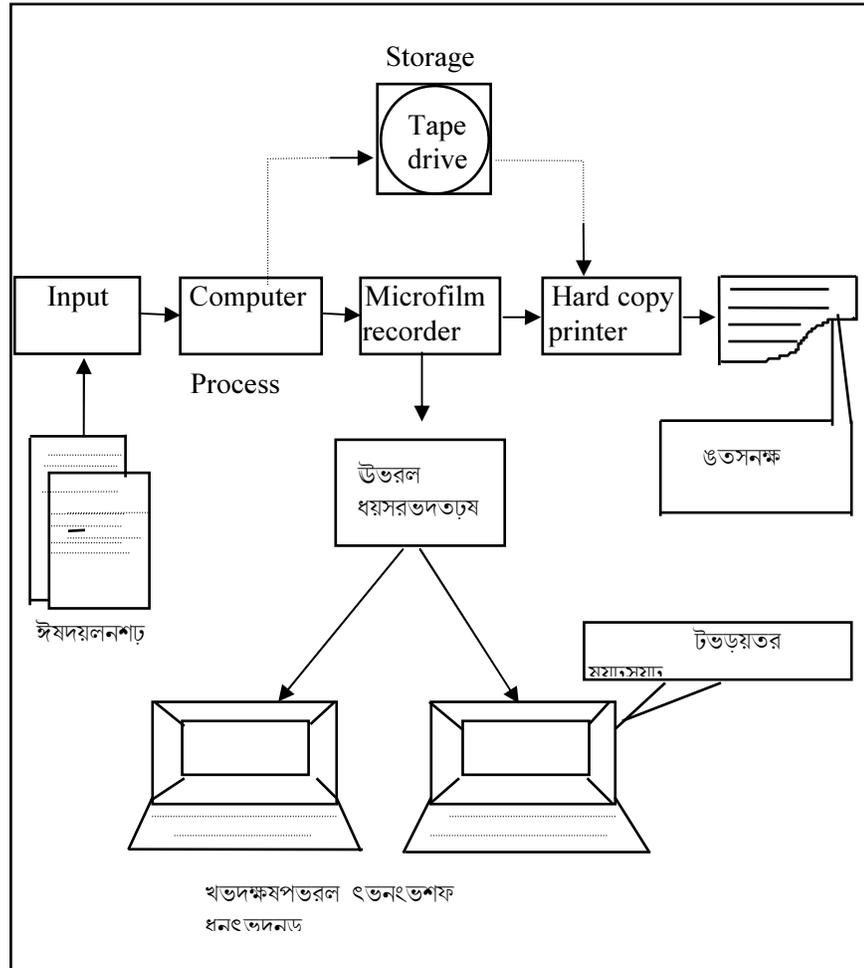


Fig. 2.8 : A schematic diagram of COM production system.

One common use of micrographics is automated filing. This is accomplished with an automated microfilm reader / printer. Another uses of micrographics is as a computer output microfilm device for word processing or electronic mail.

Uses of micrographics

Exercise

1. Multiple choice questions

a. Exact and high resolution reproduction are provided by

- i) e-mail
- ii) micro-graphics
- iii) facsimile
- iv) e-filing.

b. Digital facsimiles are

- i) much faster than analog systems
- ii) slower than analog systems
- iii) same as analog systems
- iv) none of the above.

c. The facsimile equipment may be divided into

- i) 2 types
- ii 3 types
- iii) 4 types
- iv) 5 types.

d. Central unit of facsimile equipment is capable of transmitting a business letter in

- i) less than one minute
- ii) less than 20 seconds
- iii) less than 30 seconds
- iv) more than 30 seconds.

e. Microforms are the

- i) processed input
- ii) processed output
- iii) printed output
- iv) incomplete output.

- f. CAR stands for
 - i) Computer Address Register
 - ii) Computer Assisted Retrieval
 - iii) Computer Aided Retrieval
 - iv) Central Address Register.

- g. COM stands for
 - i) Computer Output Microfilm
 - ii) Computer Output Microfiche
 - iii) Computer Oriented Microfilm
 - iv) Computer Originated Mail.

2. Analytical questions

- a. What is facsimile transmission?
- b. Describe different kinds of facsimile system
- c. What is micrographics ?
- d. What do you understand by COM ? Describe it briefly.
- e. Draw the schematic diagram of COM reproduction system.
- f. How information on film or microfiche can be read ?
- g. Point out some of the uses of micrographics.

Lesson 6 : Voice Technology

Learning Objectives

On completion of this lesson you be able to :

- describe distant computerized voice technology used in the automated office
- know the benefits of teleconferencing and computerized teleconferencing
- describe video conferencing.

Voice technology



Voice Technology

In the automated office, voice technology includes standard and centralized dictation, digital voice and teleconferencing .

Standard Dictation

Standard dictation is the recording of voice messages into a recording unit for transcription at a later time.

Standard dictation is the recording of voice messages into a recording unit for transcription at a later time. In the automated office, transcription may involve entering the material into word processing or e-mail systems. In the future dictated message will probably be directly and automatically converted into finished products via an advanced word processing system. However, the technology to achieve this is only in the research stage at present.

Centralized Dictation

Centralized dictation is a system that can simultaneously receive dictation from a number of locations, each on a different recording unit.

Centralized dictation is a system that can simultaneously receive dictation from a number of locations, each on a different recording unit. In large centralized systems, users can dial in from remote locations and dictate by touching the appropriate touch-tone keys and then speaking into a device. Dictation enhances the automated office by speeding the input information and by offering users an alternative way of entering information into an office automation system.

Digital Voice

Digital voice is the recording of voice messages in digital form.

Digital voice is the recording of voice messages in digital form so that they can be stored in a memory device, like any other computerized data for future uses and multiple copies of voice messages can easily be produced and sent to a number of recipients.



Teleconferencing

Teleconferencing is the use of digital technology to hold conferences that exchange digital voice and/or written information carried out on computer systems and or communicating word processors linked together into network.

Teleconferencing refers to the meeting of people who are geographically separated but are all participating in discussions through a telecommunications system.

Teleconferencing refers to the meeting of people who are geographically separated but are all participating in discussions through a telecommunications system. The system uses two-way voice, text or video communication equipment to allow people to interact over wide distances in real time. A number of offices/organizations are using this method to conduct important meetings with their executives scattered all over a region. For instance, a hotel in US which has a chain of branches offers a network for teleconference service. Conference speakers can go to their local branch and participate in discussions with the speakers at other branches. Participants in the teleconference can, using either digital plotters or facsimile transmitters, literally pass papers back and forth to one another as they talk, argue and debate the important points.

Although there are certain obvious advantages in face-to-face meeting, teleconference offers a number of benefits.

- Cost of travel and stay of people is eliminated
- No time is lost in travel
- No fatigue and no loss of energy
- Risk and uncertainty of public transport are avoided



Computerized Teleconferencing

A computer based teleconference is referred to as computer teleconferencing. A computer conference can be seen as something halfway between a conventional conference and a rapidly published newsletter. The system can be used by hundreds of people at diverse geographical locations. Each participant must have an access to a computer terminal connected to the conference network. Since the conference dialogue may be stored, it's not necessary for all participants to be on-line at their PCs or terminals at the same time. And, of course, it is also not necessary that they may be physically present at the same place. Instead, a person can sit at the terminal/workstation at a convenient time during the day, call up any messages/conversations, respond to questions and then sign off. Several conference participants can "talk" at the same time. Once again, interruptions of other important work can be avoided.

Computerized Teleconferencing

Office Automation Tools and Technology

The system has a database containing a large number of text messages. A message might be a *letter* or a *conference entry* and is entered by a member of the computer conference. Each member normally reads all that is written in the conference. He can freely write messages into the conference which are then made available to the other members of the conference.

The computer maintains a permanent history of all conference discussions. It therefore remembers which message each user has already seen. When a terminal is switched on, it displays all the entries which have not been seen. The user can directly write his or her own comments and messages which will be stored in the conference database.

Computer conference networks are increasingly used in developed countries. Many private and government agencies offer membership on their networks. For example, New Jersey Institute of Technology in US provides conference facilities on their network called Electronic Information Exchange System. Subscribers are grouped topic-wise such as technology, economics, etc. A subscriber may belong to more than one group. Another system known as COM designed by Stockholm University in Sweden supports two languages, Swedish and English. The Swedish-language system has more than 1000 subscribers taking part in various conferences. The English-language system has about 500 members from a dozen countries spread over three continents.

Computerized teleconferencing offers a number of *advantages*. Some of them are :

Advantages of computerized teleconferencing.

- A person can take part in many on-going conferences using much less time than for face-to face meetings.
- User can read and write at a time suitable to himself or herself.
- User need not wait for a scheduled time to take up a problem. He can communicate on any day or as and when a problem comes up.
- Messages are well prepared.
- Messages of less importance can be skipped.
- An issue or a problem could be addressed to a large group of people for their comments and suggestions. It is possible to consolidate the suggestions within a day or two.

- Since it does not involve any travel and stay, it not only saves money but also encourages even less interested people to participate.
- People with different mother-tongues find it easier to understand written messages than spoken ones. They can take their time to read.

Applications of Computer Conference : There is a lot of scope for using computer conferences in government and business organizations. Typical applications could be :

Applications of computer conference.

- Periodic meetings of heads of branch offices or units of large organizations.
- Routine discussions among various government officials.
- Exchange of experiences between experts in a particular topic of interest, say, energy, office automation, semiconductor technology, etc.
- Collection of comments and ideas on a proposed new policy.
- Meetings of numerous committees whose members are placed in different locations.
- Company sales conferences.
- Flashing out an idea for reactions before starting serious discussions.

It is essential to note that the computer conference is not a replacement for all face-to-face meetings. Facial expressions and "body language" can convey important meanings that might be missing in computer conferencing. Further, certain tasks which might include complex negotiations and a series of question-answer sessions require face-to-face meetings for fast and immediate decisions.

Video conferencing is an alternative to computer conferencing that refers to the electronic linking of geographically scattered people who are all participating at the same time.



Videoconferencing

Computer conferencing permits people to participate at different times, but an alternative to computer conferencing is **videoconferencing** - a term that refers to the electronic linking of geographically scattered people who are all participating at the same time. Facsimile devices, electronic blackboards that can cause chalk marking to be reproduced on distant TV monitors, desktop picture phones. These and other technologies allow people to meet at a common time and communicate over wide distances. Of course, there are advantages in face-to-face

meetings that videoconferencing can not replace. Facial expressions and body language can convey information that might be missed with videoconferencing. But time, energy, and money are saved when people do not have to travel long distances to attend a meeting.

Summary

Office automation technology today presents a variety of options to suit almost every organizational function. With the continuous reduction in processing and storage costs, office automation is expected to receive a major thrust in all organizations in the coming years. The availability of local area and public data networks will enhance the capabilities of office further and will improve the intra-organization communications. Word processing is by far the most widely used of technologies. Other more advanced and highly sophisticated office automation technologies include reprographics, e-mail, facsimile transmission, micrographics and voice technologies. To date, firms that have availed themselves of these technologies tend to be either large, research intensive, or both. This is because of the enormous volume of usage required to make the investment cost-effective. As costs decline and the equipment becomes increasingly more versatile, these technologies will inevitably be adopted in smaller organizations and offices.

Summary

A study of 26 US firms in advanced office automation environments found that 93% of their employees, in a wide range of job categories, used a computer and other automated technology on the job or expected to use in the near future. The study also found high levels of employee satisfaction with results of office automation.

Exercise

1. Multiple choice questions

- a. Digital voice is the recording of voice messages in
- i) analog form
 - ii) digital form
 - iii) written form
 - iv) printed form.
- b. Centralized dictation is a system that can simultaneously
- i) send dictation
 - ii) receive dictation
 - iii) transform dictation
 - iv) change dictation.
- c. Which of the following has a database containing a large number of text messages?
- i) Teleconferencing
 - ii) Computerized teleconferencing
 - iii) Digital voice
 - iv) Micrographics.
- d. Which of the following two languages are supported by COM developed by Stockholm university?
- i) French and English
 - ii) Swedish and English
 - iii) Arabic and English
 - iv) English and Bengali.
- e. The COM system of Stockholm university using English language has about
- i) 500 members from a dozen countries
 - ii) 1000 members from a dozen countries
 - iii) 1500 members from a dozen countries
 - iv) 2500 members from a dozen countries.

2. Analytical questions

- a. What are the benefits of teleconferencing?
- b. What do you know about computerized teleconferencing?
- c. Point out some of the advantages of computerized teleconferencing.
- d. What are the advantages of digital voice ?
- e. What do you know about video conferencing ?