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BLOCK INTRODUCTION: INTERNET GOVERNANCE

When the new technological features are added to society-wide communication, the process of digitalisation needs certain adjustments from the various quarters - one such adjustment is how the emerging digital platform is governed through different institutional arrangements. In this Block, four Units deal with the convergence of networks and services, alternative and open source software efforts, the need to regulate cyberspace, and particularly the ethical dimensions of digital media.

Unit 7: Convergent Technologies explores the origin and process of convergence, factors that promote the convergence and explains the convergence in different areas like technology, network, access, and services.

Unit 8: Open Source Movement deals with the need and necessity for the proliferation of alternative and open source software initiatives across the computing platforms and explores the characteristics and features of this alternative software and its application in the contemporary scenario.

Unit 9: The Regulability of Cyberspace explain the need and desirability for regulation of internet content both in developed and developing countries in relation to harmful content on online services. The Unit also describes the importance of having a self-regulatory scheme of industry governance and explores the nation's legal policies and framework for regulating cyberspace.

Unit 10: New Media and Ethical Issues deals with our personal and public conduct in the online space. It explains how new media needs to be used with care without breaching any law or violating the online rights of other users.

By reading Block 2, you will be convinced of how vulnerable cyberspace is and its consequences on individuals and many social institutions.

UNIT 7: CONVERGENT TECHNOLOGIES

Structure

- 7.0 Introduction
- 7.1 Learning Outcomes
- 7.2 Electronic Information
- 7.3 Networked Society
- 7.4 Genesis of Convergence
- 7.5 Driving Factors
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- 7.12 Let Us Sum Up
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7.0 INTRODUCTION

In this Unit, you will learn how these communication systems and networks serve human society. Their usefulness to society increases significantly when there is a synergy of purpose amongst different technologies and techniques. In other words, the use of technologies, the design of networks and the development of services must all be directed towards a common goal. Such a common goal is the evolution of humanity towards a *Networked Electronic Information Society* (NEIS). The process of bringing together different technologies, techniques, networks and services to realise the common objective of evolving towards NEIS is termed convergence. Before discussing convergence in different areas, we shall look at certain aspects of NEIS.

7.1 LEARNING OUTCOMES

After reading this Unit, you will be able to understand:

- what is meant by convergence in telecommunication;
- role of convergence in evolving towards Networked Electronic Information Society;
- origin and progress of convergence;
- factors that promote convergence; and
- convergence in different areas like technology, network, access, and services.

7.2 ELECTRONIC INFORMATION

As students of digital media, by now, you must have learnt that the world has witnessed a phenomenon of *information explosion* in the last century. The advent of the industrial age accompanied by an increase in world population has brought about significant information generation and dissemination growth. All-round developments in areas like transportation, power, communications, entertainment and education have led to enormous growth in information. By the year 1800, the quantum of information generated was doubling every 50 years, and by the year 1950, it was doubling every ten years. Today, information generated doubles every five years. By the middle of the 20th century, the quantity of information generated by industry, governments and the academic world reached unmanageable proportions. It became difficult to handle such large information manually in paper form. To illustrate this fact, let us look at an example. You all know about large aeroplanes that frequent our skies these days carrying hundreds of passengers. But do you know that the documentation in the paper form related to the design, development and operation of one class of aeroplanes weighs as much as the plane itself? There is a need to devise new ways of storing and managing information. And the new way is to record information in electronic form. Electronic information, i.e., information recorded in electronic form, can be stored in computers, processed by computers and disseminated over any communication media that we discussed in Unit 8. The electronic storage media can store large volumes of data while occupying small physical space, as we shall see in the following paragraphs. When a complete document is stored in electronic form, we call it electronic.

We use digital technology to store information electronically. Hence, an electronic document is also known as a digital document. Digital technology is very rugged and reliable and uses only two signal values to represent information. Numerically, we represent the two signal values by binary digits '1' and '0'. These binary digits are called *bits* in short. We use binary arithmetic to process bits. Eight bits together represent English language letters, Arabic numerals and special symbols like a question mark (?), dash (-), etc. The letters, numerals and special symbols are referred to as *characters*. A string of eight bits has a special name known as *a byte*. Thus, we use a byte (B) to represent a character in electronic form. A byte is a small unit as the information volumes encountered in practice are very high. We use different notations to represent high volumes of information in terms of bytes, as shown in Table 6.1.

While discussing information transfer from one place to another via a communication medium, we refer to the transmission speeds in terms of bits per second, abbreviated as *bps*. For larger speeds, we use notations like *kbps*, *Mbps*, *Gbps*, etc. Sometimes, but rarely, information volumes are expressed in bits using notations like *kb*, *Mb*, *Gb*, etc. Similarly, transmission speeds are sometimes expressed bytes per second using notations like *kBps*, *MBps*, *GBps*, etc. This is particularly true when talking about information transfer speeds within a computer. You must note that lower case 'b' denotes bits and

upper case ‘B’ denotes bytes. Many authors do not follow this convention strictly. If in doubt, obtain clarification or interpret from the context.

Table 7.1: Notation for Information Volumes

Notation
B
kB
MB
GB
TB

Note: The letter ‘k’ in kB is lower case.

Now, let us examine the storage capabilities of electronic media. Consider a Pendrive. It has a storage capacity of 1 GB. This means that we can store information equivalent to 700 million characters in a pen drive. What does this mean in terms of printed information? A line of printed text in a book has about 80 characters, and a page contains about 40 – 45 lines. Approximately, each page has $45 \times 80 = 3600$ characters. If we assume that the book has 400 pages, then the total number of characters in a book works out to be 1.4 million. Thus, a pen drive can hold close to 700 books [assuming that each book contains 400 pages]. Now, compare the physical space occupied by a pen drive vis-a-vis that occupied by 700 books! The calculations that we have just performed are for books containing only text. Diagrams, graphs and tables occupy more storage area than simple characters. Hence, in practice, we may store only about 350 books of material in a pen drive. Nevertheless, the electronic storage of information reduces the physical space required significantly. However, remember that we cannot read electronic information directly with our eyes and need a computer to read the same.

Check Your Progress: 1

Note: 1) Use the space below for your Answers.

2) Compare your answers with those given at the end of this Unit.

- 1) A small library has a collection of 10,000 books. The library proposes to digitise the books and store them on CD-ROMs. On average, a book contains 500 pages equivalent to character information. Calculate the number of CD-ROMs required to store the library collection digitally. The capacity of a CD-ROM is 640 MB.

.....

- 2) The information transfer rate between a CPU and the hard disk in a computer is 200 kBps. A serial communication link attached to the computer transmits information at the rate of 2 Mbps. Which one of the transfer rates is faster?

.....

7.3 NETWORKED SOCIETY

In the era of modern telecommunication, a networked society means a large proportion of the world population is interconnected or networked by some form of telecommunication system, and the people carry out their day-to-day activities using the network predominantly. Day-to-day activities may involve banking, ticket booking for travel or entertainment programmes, product ordering, financial transactions, exchange of emails, retrieving of information from a database, downloading of music files, simple telephone conversation, etc. Electronic information is central to all these tasks. Activities carried out in the electronic domain using networks are usually denoted with the prefix *e-*, such as e-banking. We now list some of the e-activities evolving in the networked society.

E-Activities	
e-education	e-governance
e-library	e-health
e-banking	e-commerce
email	e-entertainment

To illustrate what e-activities mean, we elaborate on two of the above activities. E-education means signing up with a university, paying fees, obtaining lessons, submitting assignments and giving examinations, all via the network without visiting the university. In India, IGNOU offers e-education in a big way. With an e-library, its resources and services can be accessed on the network without physically going to the library. For this purpose, it is necessary to store all the library resources in digital form. A library with digital resources available is known as a digital library. When accessed over networks from remote places, a digital library becomes an e-library.

Convergence in different areas is one of the basic requirements to make e-activities possible in a networked society. In the next section, we see how the phenomenon of convergence started about 50 years ago.

Check Your Progress: 2

Note: 1) Use the space below for your Answers.

2) Compare your answers with those given at the end of this Unit.

1) Distinguish between a traditional library, digital library and e-library.

.....

7.4 GENESIS OF CONVERGENCE

The genesis of convergence can be traced to the mid-1950s. At that time, computers were expensive resources and required a highly controlled environment for their operations. They were housed in big computer centres which were air-conditioned with temperature, humidity and dust control. Entry was restricted to these centres, and people were required to remove their shoes and wear aprons to work inside the centres. Computer centres

were few and often located in faraway places. Users had to travel long distances to reach the centres. Did you know that India had only three or four computers in the first half of the 1960s located in the major cities like Kanpur, Delhi, Kolkata (the then Calcutta) and Mumbai (the then Bombay)? In effect, working with computers was difficult for prospective users. Around the same time, computer manufacturers were keen on increasing the clientele for their computers for economic reasons. Being expensive resources, high usage was essential to justify the economics associated with establishing computer centres. A famous saying goes thus: *If Prophet Mohammad cannot go to the mountain, the mountain comes to him.* Computer manufacturers took an approach reflected by this saying in solving the low usage of computers. They decided to take the access to computers to the doorsteps of users. The approach is known as remote computing, i.e., the users could access a computer and perform computations from a remote location. Implementation of remote computing required a suitable communication link between the user site and the computer centre.

In those days, a computer program used to be prepared on cards by punching holes and submitted to a computer centre for execution. A program thus submitted is called a *job*. Accordingly, in remote computing, the equipment at the user premises is called *the Remote Job Entry* (RJE) terminal. This usually consisted of a card reader and a printer suitably interlinked to the main central computer via a communication link. Remote computing is the first application that brought together computer and communication, laying the foundation for technology convergence. Thus, the genesis of technology convergence lies in remote computing that started in the late 1950s.

Once remote computing was successful, there was no looking back in the combined use of computer and communication technologies. The idea of sharing data, information and other resources emerged in the late 1960s. The focus shifted from terminal-to-computer communication to computer-to-computer communication, which marked the emergence of computer networks. The ideas developed in remote computing form the basis of access to the Internet today. The convergence of computer and communication technologies took deep roots by the end of the 1960s. This was most aptly summarised in the words of a famous information scientist R. M. Fano as quoted in the following.

“The marriage of computers and communications has been celebrated and consummated. The honeymoon is over and the two partners are realising the hard realities of inter-dependence on each other.” R.M. Fano, 1972.

After many years of this marriage, the bond grows from strength to strength. Today we are witnessing the phenomenon of convergence in various areas to realise the common goal of the *networked society*. We discuss some aspects of a networked society that depend on the phenomenon of convergence in Section 10.5. But, before this, we shall examine the factors that drive the concepts of convergence in the next section.

7.5 DRIVING FACTORS

Three factors are responsible for the idea of convergence being pursued:

- 1) Societal needs

- 2) Economic necessities
- 3) Technological advancements

Remote computing gave people the taste of computing power at their doorsteps and generated a lot of interest in using computers and communications for a variety of applications. The new applications that emerged after the 1960s include the following:

- Electronic mail
- Facsimile
- Document storage and transfer
- Audio and video conferencing
- Database Access
- Electronic fund transfer
- Teletext
- Videotext

Such services generated tremendous societal demand over technology. With the growing public demand for new services, the service providers are faced with the problem of offering a variety of services at affordable prices. This meant the search for economic solutions, better infrastructure utilisation, and the adoption of innovative techniques. Convergence offers a solution to the economic provision of multiple services on a common technology platform.

Demand for new services and the economic offering can be met only if there is a corresponding technological advancement. In this context, the most significant advancement is the emergence of digital technology that revolutionised computers and communications. Digital technology forms the basis of convergence. The unique feature of digital technology is its ability to represent any signal or information in a uniform manner using a binary system. This one concept has led to great economic advantages and promoted the emergence of various applications as long as the related quantities can be represented in binary form. Amazingly, it appears that a binary system can represent anything in this creation. Much as duality (male and female) is the core principle of creation, ones and zeros of the binary system form the core of computers and communications.

The services envisaged for the NEIS may be placed under two categories: distributive and interactive. Distributive services are broadcast in nature like television and commercial radio. The choice is limited to one of the programmes being broadcast for the user. In the case of interactive services, the end-user has a facility to interact with the service provider, say a computer, and obtain services of his choice. For example, the user may ask for a specific movie on his terminal. Such services are termed *on-demand services*. They call for transmission of high fidelity voice, high-quality video and other forms of information on an interactive basis. For providing on-demand services, we need communication links with high capacity.

7.6 CONVERGENCE AREAS

There are at least five areas in which the phenomenon of convergence is visible:

- 1) Technology convergence
- 2) Network convergence
- 3) Switching convergence

- 4) Access convergence
- 5) Service or application convergence

We discuss each of these areas in the following sections of this Unit.

7.7 TECHNOLOGY CONVERGENCE

As you learnt in Unit 8, four major communication systems form part of modern telecommunications:

- 1) Electrical communication system
- 2) Optical communication system
- 3) Radio communication system and
- 4) Satellite communication system.

Now, let us see how each of these technologies converges to support the emergence of NEIS. At present, about one-sixth of the world population is connected to a telecommunication facility. Most of the connections are mobile-based or for low-speed Internet access. In this context, there are two important issues related to the emergence of NEIS:

- 1) We increase the connectivity level to cover a larger proportion of the world population.
- 2) We are increasing the communication links provided to the customers to support on-demand services.

The four communication technologies can complement each other to improve connectivity and capacity. Electrical communication uses copper cables of different types with different information-carrying capacities. Copper cables have been used for a long time for establishing networks worldwide. The information-carrying capacity of the copper cables is being continuously improved, and even today, copper cable is a favourite medium in communication systems. Optical fibres are replacing the copper wires in certain telecommunications segments because of their extremely high data-carrying capacity. However, laying copper or optical cables to every village, home and office in the world is a formidable task, and it may take many centuries if this were to be achieved. The enormity of the task becomes clear when we realise that we have been able to connect only about 15% of the world population in the last 120 years. Further, laying optical fibres is more difficult than laying copper cables because of special considerations required for optical fibres in bending and routing. With such constraints, large-scale connectivity can not be achieved in a short time frame by using cables.

Establishing connectivity via satellite links is by far the quickest. Even remotest rural areas can be brought on to the world network map in a few hours by using satellite links. The main problem with the satellite is the limited capacity. A typical present-day communication satellite offers a bandwidth that is at least a few hundred times lower than that offered by a single optical fibre. Limited bandwidth of satellites does not permit two-way interactive communication to individual homes. However, a dish antenna can be mounted on every house for broadcast applications. Such a service is known as a direct-to-home (DTH) broadcast service.

For interactive services, residential premises must be connected to a nearby communication centre that provides large bandwidth using optical fibres. This can be achieved through short-haul radio technology. The use of short-haul radio implies establishing a radio network, which can be done more easily in urban areas than in rural areas. Mobile communication, a form of short-haul radio technology, has provided fast connectivity to a large population in urban areas since its introduction in 1992. Over 900 million mobile connections have been established worldwide since 2002.

Trained human resources is an important consideration in selecting technologies. Copper cable communication is well known, and many trained technicians are available to install and maintain such systems. Optical fibres are new, and satellite communication is highly specialised. Human resources are limited in both areas. Radio communication is well understood, but mobile communication involves new concepts that are not taught extensively.

Table 7.2 summarises the strengths and limitations of different technologies discussed so far. The convergence of the four communication technologies, interoperating with each other, can provide a suitable solution to the problems of connectivity, capacity and trained human resources in the networked information society of tomorrow. A convergent technology code-named 'bluetooth' has been part and parcel of daily lives in recent years. This is a low power radio technology covering a small range of distances (up to 10 metres). The purpose of the technology is to make Bluetooth-enabled devices in the vicinity of each other communicate in a wireless mode. For example, a laptop computer may connect to a mobile phone and receive electronic mail if the two devices have a Bluetooth interface incorporated in them. Bluetooth has the potential for many interesting applications.

Table 7.2: Technology Convergence

Technology	Con
Copper cables	Fair
Optical fibres	Diff
Satellite	Rura
Short-haul radio	Urb

7.8 NETWORK CONVERGENCE

In the early days of modern telecommunication, the underlying technology was analogue. Different applications generate signals with different characteristics. To transmit such signals over distances, we need different types of end equipment and networks suitable for each signal type. For example, the voltage, current and frequency range requirements of a telephone instrument, fax machine and computer terminal are vastly different. This is what led to the development of a variety of telecommunication networks in the past, such as:

- 1) Telegraph networks,
- 2) Telex networks,

- 3) Telephone networks,
- 4) Data networks,
- 5) Alarm networks,
- 6) CATV (cable) networks, etc.

Independent networks call for separate administration, maintenance staff and buildings to house the equipment. Independent and duplicate infrastructure facilities lead to high capital costs, low maintenance efficiency and high running cost. In addition, the network facilities are never fully utilised. The net result is that the overheads turn out to be excessive, leading to economically unviable network services. The resources need to be shared among different services to keep the network costs down. This would be possible if the signal characteristics were uniform across the services. Such a solution became possible with the advent of digital technology. With digital technology, various services can be supported on a single digital network. This approach leads to the evolution of the integrated services digital network (ISDN), which is the first major multi-services network being planned and implemented worldwide. As envisioned in 1984, ISDN provides for a digital pipe at the customer premises with a minimum capacity of 144 kbps and a maximum of 2048 kbps. The realisation of the inadequacy of these rates in the context of NEIS soon led to the definition of broadband ISDN (B-ISDN). Conceived as a blueprint for future telecommunication, B-ISDN would support channels operating at bit rates in the range of 155 Mbps to 622 Mbps at the user premises.

Check Your Progress: 3

- Note:**
- 1) Use the space below for your Answers.
 - 2) Compare your answers with those given at the end of this Unit.
- 1) Compare the speeds of ISDN and broadband ISDN.

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7.9 SWITCHING CONVERGENCE

The principle of switching is central to all telecommunication networks. Switching signifies that a connection is established between two chosen ends by turning on one or more switches. The switching technique adopted by data networks is different from the one used by telephone networks. Telephone networks use the technique of circuit switching where a communication path is established between the source and destination before the actual information transfer takes place. This path and the associated resources remain dedicated between the source and destination for the entire duration of service until a disconnect request is initiated by any one of the two communicating entities. The path is used effectively if continuous traffic during the service period. However, suppose the traffic between the source and destination is noncontinuous, as with data traffic. In that case, the path remains partly idle during the service, leading to inefficient network resources. Data networks adopt another switching technique known as packet switching to overcome this drawback.

In packet switching, information transfer takes place in a *store and forward* fashion from node to node. This is like the postal system, where a letter moves from place to place in the general direction of the destination. Letters from post-boxes are taken to the local post office first. They remain there (are stored) for being sorted. Outstation letters then move (are forwarded) to a central post office for further sorting. The destination address is processed at every stage before the next forward move is made. Thus, the letters move from one location to another in the general direction of the destination. There is no connection between the letter originating station and the letter destination station. Packet switching adopts an identical principle. Data, assembled as packets, is moved from computer to computer. It is stored in each intermediate node to process the destination address and select the onward path. Once the path is chosen, the packet is forwarded along that path.

In the context of a multi-services network, it is recognised that packet switching is not suitable for real-time services like telephony and video distribution. And, circuit switching is not efficient for bursty noncontiguous traffic from the point of view of utilising network resources. Realising that circuit switching and packet switching are required for different purposes on a common digital network led to the search for new switching techniques. The two techniques have now converged, and a new switching technique called cell switching is now accepted as the standard switching technique for B-ISDN.

7.10 ACCESS CONVERGENCE

Earlier, we discussed the need for network convergence for economic reasons. The economic considerations do not apply only to network providers. It is equally important for the users. A user may not invest in different access interfaces for different services. A single telecommunication connection should fetch all types of services to a user subject only to the interface's limitations of speed and capacity. It is this philosophy that has led to the idea of access convergence. The trend of access convergence is being seen in the following:

- 1) Access to the Internet from the mobile handset and vice versa
- 2) Access to global satellite services from mobile and vice versa
- 3) Access to the Internet from the telephone network and vice versa
- 4) Access to global satellite services from the telephone network and vice versa
- 5) Automatic access among Bluetooth devices
- 6) Access to the Internet via television cables and vice versa.

Access convergence provides tremendous flexibility to end-users. They can access various services from whatever device they have on hand. For example, a person with a mobile and a laptop can access all Internet services without physically connecting to the Internet.

7.11 SERVICE CONVERGENCE

The idea of convergence in different areas discussed so far is to carry multiple services using one common infrastructure. The trend of service

convergence, i.e., offering multiple services in one interface, is seen in the following:

- 1) Internet telephony
- 2) Email via mobile phones
- 3) Web access via Bluetooth interface and mobile phones
- 4) Email and Web access via television cables
- 5) Internet services delivered on TV sets
- 6) Webcasting of radio and TV programmes on the Internet
- 7) Normal telephone services via cable TV networks.

The above are examples of some of the recently introduced services using the concept of convergence. For the future, ISDN and broadband ISDN are being designed to carry every conceivable service. Let us now see how the service convergence issue is being addressed in broadband ISDN. In broadband ISDN, the services are placed under some generic categories as shown under:

- Audio services
 - Telephone quality (speech)
 - Broadcast quality (music)
- Motion video services
 - Studio quality
 - Broadcast quality
 - High definition television (HDTV)
- Still video services
 - Low resolution (fax)
 - High resolution (pictures and photographs)
- Text services
- Computer graphics services
- Computer animation services
- Satellite imageries

Each of the above services, when digitised, demand different communication capacities, i.e., different speeds. To carry a variety of services with different capacity requirements, the architecture of broadband ISDN uses an information transport mechanism called asynchronous transfer mode (ATM). ATM is structured layered with different functionality stacked one over another. One layer is the ATM adaptation layer, which has a sub-layer functionality called convergence sublayer. This sub-layer has been designed to multiplex various services and carry them on the underlying network infrastructure.

7.12 LET US SUM UP

In this Unit, the convergence aspects of telecommunication have been discussed. Firstly, the Unit places convergence in perspective by explaining

what convergence is. The common objective of convergence in different areas, viz. The *Networked Electronic Information Society* (NEIS) is briefly discussed. The basic concepts of storing information in electronic form, electronic document, digital document, e-activities, digital library and e-library are explained. The genesis of convergence, viz., remote computing, is then discussed. The driving factors of convergence, societal needs, operation economics, and technology support are then brought out. The convergent phenomena in technology, network, switching, access and service areas are discussed. Certain aspects of the future telecommunication network B-ISDN, which are relevant in convergence, are brought out.

7.13 KEYWORDS

Bluetooth: A recent low power radio technology enables two or more devices located in the near vicinity of each other to interact.

B-ISDN: Broadband ISDN. See ISDN below. An ISDN with a very large information-carrying capacity.

Cell Switching: A convergent switching technique that combines the strengths of circuit and packet switching.

Circuit Switching: The process of establishing a dedicated connection between two endpoints via a network.

Convergence: The process of bringing together different technologies, techniques etc., to achieve a common goal.

Distributive Services: Services that are broadcast or multicast in nature, i.e., services distributed to many users without a request from the users.

Digital Document: An electronic document in which information is stored digitally.

Electronic Information: Information stored in electronic form.

E-Services: Services that are obtained from a remote place via a network.

Interactive Services: Services that require continuous interaction between the server computer and the user, e.g., searching a database.

ISDN: Integrated Services Digital Network. A network in which all signals are represented and transported in digital form.

On-demand Services: Services that users can obtain by placing a demand on the network.

Packet Switching: The process of transferring information from a source to a destination on a node-by-node basis.

RJE Terminal: Remote Job Entry terminal. An equipment setup to use computers from remote places.

7.14 FURTHER READING

- 1) Viswanathan, T. (2001). *Convergence of the Telecommunications, Information Technology, Media and Power Sectors*. New Delhi: Centre of Publications.
- 2) Viswanathan, T. (1999). *New Telecom Policy*. New Delhi: Government of India.

7.15 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

- 1) Number of books in the library = 10,000 Number of pages per book = 500

Total No. of pages = 5×10

No. of characters per page = 3600 Total No. Characters = 18×10

No. of CDs required = $\frac{(18 \times 10)}{(640 \times 10)} = 28.125$, i.e. 29 CDs

- 2) CPU - hard disk transfer rate = 200 kBps = 200×8 kbps = 1.6 Mbps
Transmission line speed = 2 Mbps

Hence, the transmission line is faster.

- 3) The traditional library comprises mostly paper documents and possibly some electronic documents. All information is stored in digital form on CDs or other storage media in a digital library. When the resources of a digital library are made accessible on a network, the library is called an e-library.

- 4) SDN minimum speed = 144 kbps

B-ISDN minimum speed = 155 Mbps

Therefore, B-ISDN is $\frac{(155 \times 10)}{(144 \times 10)} = 1076$ times faster than ISDN. Similar calculations can take higher speeds and a combination of lower and higher speeds.

UNIT 8: OPEN SOURCE MOVEMENT

Structure

- 8.0 Introduction
- 8.1 Learning Outcomes
- 8.2 History of Open Source
- 8.3 Open Source Movement
- 8.4 Open Source Software: Philosophy, Principles and Licensing
- 8.5 Types of Software
- 8.6 Desirable Software Attributes
- 8.7 Advantages of Open Source Software
- 8.8 Legal Issues
 - 8.8.1 Copyright
 - 8.8.2 Software Patents
- 8.9 Other Successful Open Source Software
- 8.10 Applications of Open Source in Other Fields
- 8.11 Let Us Sum Up
- 8.12 Further Readings
- 8.13 Check Your Progress: Possible Answers

8.0 INTRODUCTION

Open source is a set of principles and practices that promote access to the design and production of goods and knowledge. The term is commonly applied to source code knowledge. The term is commonly applied to the software's source code available to the general public with relaxed or non-existent intellectual property rights. This allows users to create software content through incremental individual effort or collaboration. Open source denotes that the origins of a product are publicly accessible in part or whole. The term open source refers to software in which the source code is freely available for others to view, amend and adapt. Typically it is created and maintained by a team of developers that crosses international and national boundaries.

Technically speaking, the software is made of lines of instructions to computers called 'code'. Depending on the complexity of the software, its code can be a few dozen lines or several million lines. This code is written following the rules of a certain grammar, called a language like C++ or Java or Python. Changing or modifying the code can extend or modify the software's features. Commercial companies like Microsoft and Oracle view the code as their intellectual property and protect it to the extent of not allowing modification even by their customers who have paid to buy and use it. Like those behind Linux Operating System or OpenOffice, open-source groups consider software as a 'building block' that can and should be modified by its users to customise it for their particular use.

8.1 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the term open-source;
- describe the difference between open-source software and proprietary software;
- list the advantages of open source software;
- describe legal issues which pertain to such software; and
- know the application of open source in other fields.

8.2 HISTORY OF OPEN SOURCE

The history of open source is a very interesting one. To start with, in the beginning, there was only one free (Libre) software. Later on, proprietary software was born, and it quickly dominated the software landscape to the extent that now it is usually considered the only possible model by many people. However, in recent times the free software has again gained popularity.

During the 1960s, when IBM and other companies were selling large scale commercial computers, they came with some free software (Libre), free in the sense that it could be freely shared among users. This came with a source code, which could be improved and modified. However, in the late 1960s and mid-'70s, the proprietary software started making its place in the market.

In the late 70s and early 80's Richard Stallman, an American software developer who had an idea that sharing source code and ideas are fundamental to freedom of speech developed a 'free' version of the widely used 'UNIX' operating system. This resulted in a 'GNU' program released under a specially created General Public Licence ('GNU.GPL'). The GPL is the license under which much Open Source code is distributed. It enshrines the idea that computer code, like speech, should be free to be copied, interpreted, modified and generally mashed up. This was designed so that source code could remain openly available to all. This software was designed for commercial usage or distribution. Such an approach was called 'free software. Thus the term "free" denotes that anyone could modify the software as per his/her needs.

During the 80's and the early 90's open-source software continued its development. USENET and the Internet helped transnational coordinate efforts and built strong user communities.

Check Your Progress: 1

- Note:** 1) Use the space below for your Answers.
 2) Compare your answers with those given at the end of this Unit.
1. Explain the basic philosophy behind the open-source concept?

.....

8.3 OPEN SOURCE MOVEMENT

This section systematically covers the definition, scope, and origin of open source software, including the fundamental differences between open source and closed source software.

8.3.1 Open Source Software

Open Source Software (OSS) is not a new idea. You already know that the open-source movement started with the Internet. Recently, technical and market forces joined together to draw a niche role of the open-source movement. The open-source movement has all the potential to define the next century's computing infrastructure (Marco & Lister, 1987). Open source is a software development model and a software distribution model. OSS development follows Linus Torvalds's (Linus Torvalds is the developer of Linux operating system – an open-source system software) style of development – *release early and often, delegate everything and be open to the point of promiscuity*. Raymond (2001a; 2001b) termed this type of software development as a bazaar-style of development in comparison with the traditional software development process (termed by Raymond as cathedral model), which is carefully crafted by individual wizards or small group of experts working in splendid isolation. The Open Source Initiative (2004), a forum to promote open-source software movement as a viable alternative to commercial software claims –

“This rapid evolutionary process produces better software than the traditional closed model, in which only a very few programmers can see the source and everybody else must blindly use an opaque block of bits.”

OSS is also considerably different from shareware, public-domain software, Freeware, or software viewers and readers made freely available without access to source code. Whether or not one registers it and pays the registration fee, shareware typically provides no access to the source code. Unlike freeware and public domain software, OSS is copyrighted and distributed with license terms designed to ensure that the source code is always available. Sometimes, a small fee may be charged for the software's packaging, distribution, or support.

Definition

The open-source movement has been in conscious development for nearly two decades, but the term “open source” itself has been a relative latecomer. Christine Peterson of the Foresight Institute proposed the term *open source* in late 1997 during a meeting of a small group of open-source movement key persons (Raymond, 2001c). This group registered the domain name *opensource.org*, defined “open source,” developed Open Source Initiative (OSI) group, designed OSI certification, and created a list of licenses that meet the standards for open source certification. In the open-source software development model, the software's source code is made freely available along with the binary version so that anyone can see, change, and distribute it subject to the condition he/she abides by the accompanying license. According to OSI (Open Source Initiative, 2003a) –

“Open source promotes software reliability and quality by supporting independent peer review and rapid evaluation of source code. To be certified

as open source, the license of a program must guarantee the right to read, redistribute, modify, and use it freely”.

Analysis of definitions given by Chudnov (1999), Raymond (1996), Moody (2001), and Morgan (2002) identifies the following attributes of OSS –

- OSS is typically created and maintained by developers crossing institutional and national boundaries, collaborating by using Internet-based communications and development tools;
- OSS development process follows the famous Linus’s law – “Release early, release often and listen to users”;
- Quality, not profit, drives open source developers who take personal pride in seeing their working solutions adopted; and
- Intellectual property rights to open source software belong to anyone who helps to build it or simply use it and is not locked to any single vendor or institution.

8.3.2 Open Source Software: Development Path

The computing community started realising the advantages of sharing source codes in the late 1970s by using the Internet as a platform. The early 1980s witnessed a big conflict between OSS and proprietary software. For example, MIT Artificial Intelligence Lab established Symbolics in the early 1980s and made all the freely available software proprietary under its name. This conversion process eventually killed the culture of code-sharing at MIT Lab. This destruction is important in OSS history because it initiated the free software movement through the formation of the Free Software Foundation (FSF). Richard Stallman, one of the MIT lab members, started The GNU (recursive acronym for GNU is Not Unix) project (a free operating system) in January 1984 and established FSF in 1985 to promote Free Software and the GNU project. The next big contribution to the free software movement came from a student in 1991. Linus Torvalds, who was a second-year graduate student at the University of Helsinki, wrote a Unix-like kernel (Kernel is a core part of the operating system) and named it Linux. He distributed Linux widely, considered users as co-developers and improved it considerably quicker. Linux kernel soon adapted to become the core of the GNU/Linux operating system, and many other parallel projects (like BIND, Perl etc.) merged with it. In 1997 GNU/Linux became the buzzword in the computing community because, within five years, it owned 25 per cent of the server market and grew at the rate of 25 per cent per annum. It’s now clear that the code sharing and free software culture has been in conscious development for nearly three decades since the beginning of the Internet. But the term “open source” has been a relative latecomer. Christine Peterson of the Foresight Institute proposed the term *open source* in late 1997 during a meeting of a small group of open-source movement key persons (Raymond, 2001a). This group registered the domain name *opensource.org*, defined “open source,” developed Open Source Initiative (OSI) group, designed OSI certification, and created a list of licenses that meet the standards for open source certification.

8.3.3 Open Source Software vs Commercial Software

The whole array of software can be grouped into two fundamental categories – system software and application software. System software (such as operating systems) is responsible for the overall management of computer resources. In contrast, application software is designed to perform certain tasks and thereby make computers able to perform different predefined jobs. This division is based on the application domain of software. The distribution policy may be grouped into two broad divisions – close source software and open-source software (OSS). Open-source software is also known as Free/Open Source Software (FOSS) or Free/Libre Open Source Software (FLOSS). Closed source software may again be placed in two groups – commercial software and Freeware. So, as per the distribution policy (as mentioned in the beginning), the whole array of software may be categorised into three groups – Commercial software, Freeware, and Open-source software.

Table 8.1: Software as per the distribution policy

Commercial software	Freeware	Open-source software
Only binary code is available against fees	Only binary code is available at no cost	Both source code and binary codes are available at no cost
As source code is not available, customisation is not possible	As source code is not available, customisation is not possible	As source code is available, extensive customisation is possible and allowed
The license agreement allows only the use of software for a definite period, and it is mandatory	The license agreement allows to use for an indefinite period, and it is optional	The license agreement allows to use, change, modify and distribution of software for an indefinite period, and it is mandatory

You can easily understand from table 7.1 that the fundamental difference is the opportunity for customisation. Open source also provides freedom to redistribute the customised version of the software.

8.4 OPEN SOURCE SOFTWARE: PHILOSOPHY, PRINCIPLES AND LICENSING

You already know from the previous section what open source is and how it differs from other software distributions, including a brief history of the open-source movement. In this section, we will study philosophies and principles of open-source software, IPR issues related to open source and the application of open standards in open source software development.

8.4.1 Philosophy of Open Source Software

The open-source software world is dominated by two major philosophies: the Free Software Foundation (FSF) philosophy and the Open Source Initiative (OSI) philosophy. The philosophy of FSF centres around four user-driven freedoms –

- the freedom to run a program, for any lawful purpose;
- the freedom to study how a program works and adjust it to specific needs
- (obviously, access to the source code is a precondition for this);
- the freedom to redistribute software; and
- the freedom to improve a program and distribute a modified program (again, access to the source code is a prerequisite for this).

Therefore, we may say that freedom is at the core of FSF philosophy – the freedom to use, study and customise, the freedom to redistribute, the freedom to cooperate. FSF philosophy is against software patents and additional restrictions in existing copyright laws. On the other hand, the OSI philosophy is slightly different from the FSF philosophy. The philosophy of OSI gives less emphasis on the ethical issues as proposed by FSF. It is directed towards the practical rewards of the distributed development process of open-source software. It targets the technical values of the participatory software development model for developing software and is more business-friendly than the FSF. But there are many common issues in these two philosophies of open-source software development, such as efforts against the proliferation of commercial software, software patents and making the software development process easy and user friendly. Richard Stallman, the father of FSF, rightly said that the Free Software Movement and the Open Source Movement are two political parties in the same community (Wong and Sayo, 2004).

8.4.2 Open Source Software (OSS)

On the other hand, open-source software is one where there is an underlying ‘source code’ made available under a licence. The developers and users have to adapt and modify it as per their needs.

However, the distribution terms of open-source software must comply with the following criteria:

- i) **Free Redistribution:** The licence given shall not disallow the other party from selling the software as a component of an aggregate software distribution containing programs from different sources. Furthermore, the licence will not be given for fee or royalty for such a sale.
- ii) **Source Code:** The program must have a source code, and there should be a distribution in that source code.
- iii) **Derived Works:** The licence must allow changes and derived works and permit them to be distributed under the same terms as the licence of the original software.
- iv) **The integrity of the Author’s Source Code:** The license may restrict source code from being distributed in modified form only if the licence allows the distribution of ‘patch files’ with the source code to modify the program at build time.
- v) **No Discrimination Against Persons or Groups:** The licence must not discriminate against any person or group of persons.

- vi) **No Discrimination Against Fields of Endeavour.** The licence must not restrict anyone from using the program in a specified field.
- vii) **Distribution of Licence:** The right attached to the program must apply to all to whom the program is redistributed without the need to execute an additional licence by those parties.
- viii) **The licence must not be Specific to a Product:** The rights attached to a program must not depend on the program's being part of particular software distribution.
- ix) **The licence must not Restrict Other Software:** The licence must not place restrictions on other software distributed along with the licensed software.
- x) **The licence must be technology-neutral:** No licence promotion may be predicated on any individual technology or style of interface.

8.4.3 Licensing of Open Source Software

Licensing issues related to open source software are complex. Open-source software may be released under a variety of different licenses. Open Source Initiative (OSI) reported the availability of more than 60 licenses and categorised these licenses under eight categories (<http://www.opensource.org/licenses/index.html>). However, an in-depth analysis shows that there are only two primary types of licenses, and countless variants are based on these two widely adopted licenses. These two main licenses are the GNU (recursive acronym for GNU's Not Unix) General Public License (GPL) and the BSD-style licenses.

The GNU General Public License (GPL)

The key features of GPL are – i) user freedoms is ensured and protected; ii) source code is always available; iii) users are allowed to copy, distribute and modify original code; iv) any changes made to a GPL program by the distributor must also be licensed under the GPL; v) distributors may not place any non-GPL restrictions upon the users; vi) recipients of GPL software are granted the same rights as the original distributor; and vii) a commercial software company cannot take a GPL program, modify it and then sell it under a different, proprietary license.

BSD-style Licenses

BSD-style (Berkeley System Distribution) licenses are identical to the original license issued by the University of California, Berkeley. These are among the most permissive licenses and include key features like – i) attribution is given to the original license holder by including the original copyright notice in source code files; ii) no attempt is made to sue or hold the original licensor liable for damages; iii) software code available under BSD-style license can easily be incorporated into commercial applications; and iv) BSD-style licenses do not require the distribution of source code (after modification of original code). These two major licenses may be compared against the following features in the context of distributing open-source software –

Damages; iii) software code available under BSD-style license can easily be incorporated into commercial applications, and iv) BSD-style licenses

do not require source code distribution (after modification of original code). These two major licenses may be compared against the following features in the context of distributing open-source software –

	GPL Licensed	BSD Licensed
Must distribute source code	Yes	No
Must distribute user-created source code	Yes	No
User-created source code must be available under GPL	Yes	No
Proprietary Software linking possible	No	Yes
Compatible with GNU GPL	Yes	No*

*The original BSD license is not GPL compatible, but the modified BSD license is compatible with GPL.

8.4.4 Open Source and Open Standards

Library services have long depended on shared standards. Recently, one question has been attracting our attention: whether a specific standard is open or proprietary. A proprietary standard is characterised by the fact that it is owned by someone (individual or organisation) who puts restrictions on - or can put restrictions on - users' access and use. On the other hand, a completely open standard has the following properties:

- It is accessible and free of charge to all (i.e. there is no inequity between users, and no payment or other considerations are required as a clause of use of the standard);
- It remains accessible (i.e. owners will not limit access to the standard later on, i.e. afterwards); and
- All standard aspects are translucent, well documented, and freely available.

The W3C (2006) provides a set of six-pack criteria in defining Open Standards:

- transparency (the due process is public, and all technical discussions, meeting minutes, are archived and citable in decision making);
- relevance (new standardisation is started upon due analysis of the market needs, including requirements phase, e.g. accessibility, multilingualism);
- openness (anybody can participate, and everybody does: industry, individual, public, government bodies, academia, on a worldwide scale);
- impartiality and consensus (guaranteed fairness by the process and the neutral hosting of the W3C organisation, with equal weight for each participant);
- availability (free access to the standard text, both during development and at the final stage, translations, and clear IPR rules for implementation, allowing open source development in the case of Web technologies); and

- maintenance (ongoing process for testing, errata, revision, permanent access).

Software development, as a process, depends on standards (de jury/de facto or proprietary/open) in each step. Open standards provide the following advantages – 1) free to apply for any lawful purposes; 2) open and collaborative development process; 3) well documented and no chance of data loss due to technical obsolescence. The visible disadvantages of open standards are – 1) availability of only a few major players (e.g. Loc, IFLA etc.); 2) lack of coordination between open standard initiatives and open source software developers; and 3) non-availability of open standards in many important facets of library activities (e.g. exchange of bibliographic and authority data). Some of the well known open standards used in different library-related software are – MARC 21 family of standards for resource description, MARC-XML as exchange format, OAI/PMH as metadata harvesting standard, SRU/SRW as standards for web-based distributed searching etc.

8.5 TYPES OF SOFTWARE

Computer software can be broadly split into two development models.

1. Proprietary software, and
2. Open-source software (OSS)

As the name suggests, proprietary software or ‘closed software’ restricts access to and use of the source code. As per “Wikipedia”, proprietary software has restrictions on using and copying it, usually enforced by a proprietor. The prevention of use, copying, or modification can be achieved by legal or technical means. Technical means include releasing machine-readable binaries and withholding the human-readable source code. Legal means can involve software licensing, copyright and patent law.

The term is used by the Free Software Foundation to describe software that is not free software or semi-free software. Technically, the term means software with an owner who exercises control over the software. Thus, it can be used for all software not in the public domain. However, the FSF uses the term to highlight that the owner is of prime importance, in contrast to “free software”, where computer users’ freedom is of prime importance.

Proprietary software, thus, in other words, means that which is owned by an individual or a company (the one that developed it), and thus there are major restrictions on its use, and its source code is therefore kept secret.

Check Your Progress: 2

- Note:** 1) Use the space below for your Answers.
2) Compare your answers with those given at the end of this Unit.

1. How does open-source software differ from proprietary software?

.....
.....
.....
.....

8.6 DESIRABLE SOFTWARE ATTRIBUTES

The debate over the merits of proprietary software and OSS has gained great momentum in recent years. However, the following attributes are desirable both in open source and proprietary software.

Reliability – how far a system is reliable without any disturbance?

Quality – number of errors in a fixed number of lines of code

Security – how flexible the software is to unauthorised actions, e.g. (virus)?

Flexibility – how easily the software can meet the needs of different devices?

Project Management – how organised it is?

Open Standards – if a document is created in one type of software, can it be readable in another.

Switching Costs – the expense for moving from one system to another

Total Cost of Ownership (TCO) – the total cost expense over the lifetime of the software.

User Friendliness – how easy is it adopted by people?

8.7 ADVANTAGES OF OPEN SOURCE SOFTWARE

The usual notion is that open source software is made available at a low cost, but this can be true in the case of proprietary software too. Therefore following are some of the advantages of open-source software.

Since the source code is available and one can modify it, it is important. This enables the unlimited timing and improvement of a software product. This also makes it possible to port the code to new hardware, adapt it to the changing conditions, and reach a detailed understanding of how the system works. Now experts understand that to increase an application's lifetime, and it must be available in a source form. It has been seen that binary-only application does not survive for more than ten years in an unmodified form. However, open-source software systems have survived for more than twenty years and are still widespread. Because of the availability of source code, one can also isolate bugs and fix them.

Technical motivations are common because there are different ways to perform work at times, and one may not decide which one is better. So if the two parties do not reach a consensus and the user base is quite large, the code then splits into two, but both continue development. If the reasons for the split comes to an end, and both the parties agree, then there may be a reunification. In other cases, a 'fork' is used to coordinate work.

E.g. the Linux kernel has two distinct codebases, one stable and one experimental. This way, one can introduce new and potentially dangerous technologies without disrupting the stable ones.

Another advantage of open-source software is that no per-copy fee can be asked for modified versions, and thus anyone can use the current code base to start whatever new projects. One can gather knowledge at a very low cost.

This is why internet software systems have become an important factor in the new economy. All new aspirants who are trying new technologies can now integrate and adopt them immediately without any licence agreements. The right to freely modify them is a bonus that has led to innumerable expansions in the number of communication protocols and systems, each based on the needs of one and all. This is one of the reasons for the success of the Linux Kernel, which the students widely use during the start-up phase till they turn into entrepreneurs.

Another advantage of OSS is minimal conflicting priorities due to marketing pressures. This is because no single commercial entity is pushing for precise delivery dates or features that must be supported. Usually, OSS is made available to people only when it is ready and when the development team believes it is good enough for use.

Finally, OSS gives a new platform for democratic action. One can say that it provides a platform for democratic action because it is designed the way people need it, improvements are made as per their needs. Thus, the community's collective desire determines the overall direction of development and modification without compelling anyone to do that. Thus, public opinion is the backing force that leads to the progress of such software.

Check Your Progress: 3

- Note:** 1) Use the space below for your Answers.
2) Compare your answers with those given at the end of this Unit.

Fill in the blanks:

- 1) With open-source software, there is always the possibility of creating an base if the recent one is perceived as wrongly managed.
- 2) The is the backing force that leads to the progress of such Open Source Software.

8.8 LEGAL ISSUE

8.8.1 Copyright

Software is protected using the copyright system. The same protection is given as on books, music or film, and the buyer of software has licenced the use of a copy of the product. Software is usually not purchased, but a licence is given to use it. Copyrights are used to protect computer software, but all do not use copyrights to have rights in the software. Some use copyrights so that no one may have any rights in software; there is a new word for it, 'copyleft'.

As we know, software, where source code and object code are freely available, is called 'open-source software. In copyleft open source software, source code and object code are freely available to be used, modified and improved without any changes. The term open-source software is often used in the sense of open source software that is copyleft.

8.8.2 Software Patents

Whereas copyright protects the software code from being copied, patents can prevent the innovative solution or effects of software from being copied. Now, usually, the government grants the patent holder rights in return for sharing the information on how the technical result was achieved. The extent to which the software should be patentable is controversial. A key issue is whether the software has a ‘technical effect’ or is used for business.

The scenario in the US is that the software can be patented for business processes. In the EU currently ‘business processes are not patentable.

8.9 OTHER SUCCESSFUL OPEN SOURCE SOFTWARE

- 1) Open office.org suite
- 2) Mozilla
- 3) Ximian

Office suite provides a bundle of software that is used in an office. The most popular office suite is Microsoft Office Suite. Open Office.Org suite is similar to it.

The software which permits one to access the Internet is called Web Browser. There is much such software - Opera, Internet Explorer etc. Mozilla is an open-source web browser, and Mozilla both can be operated in Linux and Windows.

Microsoft Outlook is an electronic personal information manager. It manages one’s email, calendar, appointments etc. Ximian is also an electronic personal information manager. It is similar to Microsoft Outlook; however, it works on Linux only.

A good number of open-source alternatives are available for popular proprietary software - find a list of these alternatives in this link - <https://opensource.com/alternatives>.

There are plenty of services available on the Internet classified as open-source applications - like MySQL, Apache, Content Management Systems, email applications, data analytics tools, data visualisation tools etc. You find detailed information and examples in this link - <https://opensource.com/resources/projects-and-applications>.

Check Your Progress: 4

- Note:** 1) Use the space below for your Answers.
 2) Compare your answers with those given at the end of this Unit.

1. Name a few open-source software.

8.10 APPLICATIONS OF OPEN SOURCE IN OTHER FIELDS

The principle of open source can be applied to a variety of other applications and software development. They are:

Markets: Software is not the only field affected by open source; many fields of study and social and political views have been affected by the growth of the concept of open source. Advocates of one field will often support the expansion of open source in another field, including Linus Torvald, who is quoted as saying, “the future is open source everything”.

The open-source movement has inspired increased transparency and liberty in other fields, including the release of biotechnology research by CAMBIA and the encyclopedia named ‘wikipedia’.

Cola Drinks: Open cola is another idea inspired by the open-source movement. Soft drink giants like Coke and Pepsi hold their formulas closely guarded secrets. Now volunteers have ported the recipe for a similar soda drink on the Internet. The taste is said to be comparable to that of the standard beverages.

Beer: There is also an open-source beer called Varese.

Pharmaceuticals: There have been several proposals for open-source pharmaceutical development, like the one that led to establishing the tropical disease initiative. There are also several not for profit “virtual pharmas” such as the Institute for one World Health and the Drugs for Neglected Diseases Initiatives.

Let us now summarise the points covered in this Unit.

8.11 LET US SUM UP

- Open-source software, in other words, means software where the source code is made available to all, and a licence is given for the modification and development of the software as per the user’s need.
- The availability of the source code makes it simpler to use by the user.
- However, there are legal issues related to such software: copyright and patent issues.
- The open-source movement is gaining momentum in other fields other than the software, i.e. we now have open colas, open-source in software, hardware, pharmaceutical industries etc.

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8.13 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

Check Your Progress: 1

1. In the late 70's and early 80's Richard Stallman, an American software developer who had an idea that sharing source code and ideas are fundamental to freedom of speech developed a 'free' version of the widely used 'UNIX' operating system. This resulted in a 'GNU' program released under a specially created General Public Licence ('GNU.GPL'). The GPL is the license under which much Open Source code is distributed. It enshrines the idea that computer code, like speech, should be free to be copied, interpreted, modified and generally mashed up. This was designed so that source code could remain openly available to all. This software was designed for commercial usage or distribution. Such an approach was called 'free software. Thus the term "free" denotes that anyone could modify the software as per his/her needs.

Check Your Progress: 2

1. As the name suggests, proprietary software or 'closed software' restricts access to and use of the source code. As per "Wikipedia", proprietary software has restrictions on using and copying it, usually enforced by a proprietor. The prevention of use, copying, or modification can be achieved by legal or technical means. Technical means include releasing machine-readable binaries and withholding

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the human-readable source code. Legal means can involve software licensing, copyright and patent law. The term is used by the Free Software Foundation to describe software that is not free software or semi-free software. Technically, the term means software with an owner who exercises control over the software. Thus, it can be used for all software not in the public domain. However, the FSF uses the term to highlight that the owner is of prime importance, in contrast to “free software”, where computer users’ freedom is of prime importance.

Check Your Progress: 3

1. Alternative code
2. Public opinion.

Check Your Progress: 4

1. Mozilla, Linux.



UNIT 9: THE REGULABILITY OF CYBERSPACE

Structure

- 9.0 Introduction
- 9.1 Learning Outcomes
- 9.2 Desirability of Regulation of Cyberspace
 - 9.2.1 Need for Regulation of Cyberspace
- 9.3 How Cyberspace can be Regulated
- 9.4 Legal and Self Regulatory Framework
 - 9.4.1 Filtering Devices and Rating Systems
- 9.5 Government Policies and Laws Regarding Regulation of Internet Content
- 9.6 Regulation of Cyberspace Content in the United States
 - 9.6.1 Communications Decency Act 1996(CDA)
 - 9.6.2 Internet Online Summit (December 1997)
 - 9.6.3 COPA
 - 9.6.4 CIPA
 - 9.6.5 Other Related Legislation
- 9.7 Regulation of Cyberspace Content in Australia
- 9.8 Regulation of Cyberspace Content in European Union
- 9.9 Regulation of Cyberspace Content in the United Kingdom
 - 9.9.1 Related Legislation in the UK
- 9.10 Regulation of Cyberspace Content in India
- 9.11 International Initiatives for Regulation of Cyberspace
- 9.12 Let Us Sum Up
- 9.13 Further Readings
- 9.14 Check Your Progress: Possible Answers

9.0 INTRODUCTION

Internet is not a physical or tangible entity but rather a giant network that interconnects innumerable smaller groups of linked computer networks. The term ‘online’ (relating to communication and its mode of transmission by telecommunication lines) can also be used. There has been a rapid increase in the use of the online environment where millions of users have access to internet resources and provide content daily. This content can be accessed from any computer connected to the network. The content may be stored on a number of different computers or ‘servers’ that need not be in the same jurisdiction as the person accessing the material. Internet users may be completely unaware of where the resource being accessed is, in fact, physically located. This computer networking has been very

helpful for businesses of all types for a variety of commercial transactions and consumer services. Apart from transactions involving physical goods, digitised information products such as music, photographs, novels, motion pictures, multimedia works, and software can also be done online. It also leads to an increase in economic and creative interactions in the future. It inevitably also leads to the expansion of disputes involving the acquisition, use, possession, processing, and communication of information.

The rules for regulating business interaction in a country are different from rules for online commerce. Every country in the world is regulated by law, which is the primary source of regulation. Social norms which guide one behaviour also function as a secondary regulatory constraint. The third constraint is the market which regulates through price mechanism by limiting the amount a person can spend on different needs; another constraint may be the nature of the world in which we exist. In the real world, the person or entity with whom interaction relating to a business can be located; thereby, the validation of a transaction is facilitated. But in CyberSpace is very difficult since parties to a transaction may be sitting in adjoining rooms or distant locations, but the network offers no way to know it. It is often argued that cyberspace is unavoidable, but it is not regulable; its behaviour can't be regulated. According to Dr. Dan L. Burk, Assistant Professor of Lawseton Hall University, there is no coherent homology between Cyberspace and real space, and screening or blocking Internet resources by country is nearly impossible. On the other hand, it is argued by Lawrence Lessing in his article, 'The Laws of Cyberspace', that Cyberspace has the potential to be the most fully and extensively regulated space that has ever been known – anywhere at any time in our history. According to him, just as in real space, behaviour in Cyberspace is regulated by four sorts of constraints, i.e. law, social norms, market and codes (also called architecture).

Every technological revolution brings a new spate of legal issues and legal problems to be addressed. The real purpose of our study is to stress the need for regulation of Cyberspace and the possibility and scope of its regulation.

9.1 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the need and desirability for regulation of internet content both in developed and developing countries;
- discuss that in relation to harmful content on online services, the greater emphasis is on the self-regulatory scheme of industry governance;
- discuss the nation's legal policies and framework for regulating cyberspace;
- state the desirability for an international framework of principles, guidelines and rules for global communication; and
- discuss the need for coordinated national, if not international criminal laws to deal with illegal content on online services.

9.2 DESIRABILITY OF REGULATION OF CYBERSPACE

9.2.1 Need for Regulation of Cyberspace

The following reasons can be cited in favour of the above proposition:

- 1) The most visible and readily sensational concern is about the use of the Internet, particularly for the distribution of obscene, indecent and pornographic content. The use of the Internet for child pornography and child sexual abuse and the relative ease with which the same may be accessed calls for strict regulation.
- 2) Cyberspace's challenge to traditional notions of jurisdiction and regulation is another factor. The increasing business transaction from tangible assets to intangible assets like Intellectual Property has converted Cyberspace from mere info space into an important commercial space. The attempt to extend and then protect intellectual property rights online will drive much of the regulatory agenda and produce many technical enforcement methods.
- 3) With the inventions of new technologies, the media has enhanced the possibility of invasion of the privacy of individuals and bringing it into the public domain. The major area of concern where some sort of regulation is desirable is data protection and data privacy so that industry, public administrators, netizens, and academics can have confidence as online users.
- 4) Encryption is the process of converting a message or document into a form that hides the content of the communication from the eyes of an eavesdropping third party and needs to be decrypted if its content is to be read. New cryptographic techniques (cryptography is the process used to encode/encrypt electronic information) are commonly cracked relatively quickly by computational force or other analytical means. Therefore another area in which regulation has assumed importance is in the debate over whether the public should be permitted to use 'cryptography' or not.
- 5) The Internet has emerged as the 'media of the people as the Internet spreads fast, there were changes in the press environment centred on mass media. Unlike in the established press, there is no editor on the Internet. In the press and publication environment, editors check the truthfulness of facts and circulate them once the artistic values are confirmed. On the Internet, however, people themselves produce and circulate what they want to say, and this direct way of communication on the Internet has caused many social debates. Therefore the future of Cyberspace content demands the reconciliation of the two views of freedom of expression and concern for community standards.
- 6) Another concern is that money laundering, be 'serious crime', becomes much simpler through the use of the net. The person may use a name and an electronic address. Still, there are no mechanisms to prove a person's association with an identity. A person can be restricted to a single identity, or identity can be restricted to a single person.

Viruses, rumour-mongering, hate mail and mailbox bombardment are all describable phenomena. Because of the fear of retribution, all are more likely to use a fake identity or maybe anonymous mailers rather than a readily identifiable person. Therefore Cyberspace needs to be regulated to curb this phenomenon.

Check Your Progress: 1

- Note:** 1) Use the space below for your Answers.
2) Compare your answers with those given at the end of this Unit.

1. Describe the need for regulation of cyberspace?

.....
.....

9.3 HOW CYBERSPACE CAN BE REGULATED

In “Code and other Laws of Cyberspace”, Lawrence Lessing argues that the architecture (code) of the Internet, i.e. the hardware and software of Cyberspace that defines the system, can be a form of regulation. It is a set of rules implemented or codified in the software by the code writers, requiring the constant certification of identity.

In “A Non delegation doctrine for the digital age” (Cited: 50 Duke L.J. 5), James Boyle argued that regulation of the Internet could increasingly rely on a three-fold strategy:

1. **Privatisation:** The state can use a private body to achieve goals that it could not get directly and then implement that body’s decision through mandatory technological arrangements. For e.g. for Copyright enforcement in Cyberspace, the Clinton administrations original plan was to make Internet Service Providers (ISPs) strictly liable for copyright violations by their subscribers – thus creating a private police force, largely free of statutory and constitutional privacy constraints with strong incentives to come up with innovative surveillance and technical enforcement measures.
2. **Propertisation:** According to him, first of all, an attempt is to be made to extend and then protect intellectual property rights online. This will produce many technical methods of enforcement.
3. **Technological Controls** the system is to be designed to hardware in desired regulatory features. E.g. Digital texts and music could be encoded to a particular person. Detection devices could be built into players so that others cannot play one’s music. Unique identifiers could be built into computer chips so that a person’s computer would broadcast a universal ID with an associated set of legal characteristics as you roamed the net.

Blocking software or Internet contents grading systems are other forms of regulations based on technology. In Korea, the government has started the internet contents grading system. The system forces the sites designated as ‘content harmful to minors’ to attach an electronic tag that the blocking software can catch. Especially the Korean government categorises

homosexual sites as content harmful to minors, and those sites are often blocked.

9.4 LEGAL AND SELF REGULATORY FRAMEWORK

In any country, the role of government is seen as the provider of the legal and regulatory framework within which its subjects have to function. In this context of regulation of cyberspace, it can be said that the Internet's design precludes central control, which the government may regulate to make the information economy safe, secure, certain and open. Rather in the last few years, outstanding progress has been made in identifying appropriate structures for industry self-regulation with the appropriate minimum level of government intervention. The development of technology to permit content labelling and the early growth of complaint hotlines in many countries has helped to provide the ingredients for self-regulatory schemes. Here we will discuss some of the major developments in national and international cooperation, major developments for effective online industry regulation in various countries, and end-user voluntary use of filtering/ blocking technologies. This approach is taken in the United Kingdom, Canada, New Zealand, and many Western European countries.

But the idea that Cyberspace should be presumptively self-governing has resounded in thoughtful scholarship. Many scholars have criticised it, and it has been argued that the selective government regulation of Cyberspace is warranted to protect and promote liberal democratic ideas. However, in this Unit, we will not go into the jurist's debate whether Cyberspace can be self-regulated or not but try to find out the possibilities in the existing legal framework in various countries for regulating internet content.

9.4.1 Filtering Devices and Rating Systems

'Filters' are software tools used to block access to unwanted material. By the 1990s, concerns about problematic content on online services had prompted the development of a range of content filter software and rating systems, including the Platform for Internet Content Selection ('PICS'); for example, E-mail filters automatically delete the bulk of unread e-mail messages commonly known as 'spam' and can also be customised to delete incoming messages from particular sources. There can be site-blocking filters to screen out specified websites or websites containing specified keywords that the system presumes to relate to other objectionable content. Site blocking filters may also use a protocol, 'PICS' developed by the World Wide Web Consortium ('W3C') to develop common protocols for its evolution and ensure its interoperability. Organisations in several countries have established labelling schemes, which conform to the PICS standards, designed for use by parents and schools. For example, RSACi (Recreational Software Advisory Council labelling scheme for the Internet) rating system addresses the level of violence, sex, nudity, and language on a website. It operates as a classification of the content on an Internet site rather than making a judgment about its appropriateness for any given audience or purpose. Such an approach has advantages over those filtering programmes that operate on a keyword basis to exclude offensive material. Still, inevitably, a

significant amount of useful, inoffensive content is also blocked. However, its major disadvantage is that it is limited to rating functions rather than more general information. Consequently, it is not adapted to perform more complex information retrieval searches. Other labelling schemes are Safe surf, Cyber Patrol and Surf Watch.

In 1997 W3C created the ‘Metadata Activity, which includes the Resource Description Framework (RDF) Working Group. RDF is a protocol for a description of Internet content based on a set of 105 ‘categories’ of information, known as the ‘Dublin Core’, which is used to Filter out obscene content. However, it does not deal with controversial content or aim to protect children from harmful content, but describes those aspects of the content such as authorship, publishers, date and source in a similar way to that developed by library catalogues and facilitates more effective searching. Examples of its applications include search engine data collection and digital library collections. Therefore it has not been widely used as an alternative to those schemes that eliminate content based on controversial content alone (see speech by Gareth Grainger).

Check Your Progress: 2

- Note:** 1) Use the space below for your Answers.
2) Compare your answers with those given at the end of this Unit.

1. What do you mean by the term filters? Give examples.

.....
.....
.....

9.5 GOVERNMENT POLICIES AND LAWS REGARDING REGULATION OF INTERNET CONTENT

According to Electronic Frontiers Australia (EFA, March 2002) report on government policies regarding internet censorship in various countries, government policies can be classified into the following four categories:

- 1) The policy to encourage self-regulation.
- 2) Criminal law penalties (Fines or Jail Terms) apply to content providers who make content “unsuitable for minors” available online.
- 3) The government has also mandated blocking access to content deemed unsuitable for adults; for example, Australia, China, Saudi Arabia, Singapore etc.
- 4) A number of countries have either prohibited general public access to the Internet or required internet users to be registered/licensed by a government authority before permitting them restricted access.

However, concerns over access to content on the Internet are very markedly around the world, and this is reflected by the respective regulatory policies, which we will now discuss below.

9.6 REGULATION OF CYBERSPACE CONTENT IN THE UNITED STATES

The exponential growth in the usage of online services in the United States in the late 1990s and early 1990s led to demands for its operations to be regulated.

9.6.1 Communications Decency Act 1996 (CDA)

Section 502 of the CDA amended sections 223(a) and (d) of Title 47 of the United States Code ('USC'). It prohibits the making and transmission of obscene or 'indecent' material to a minor by means of a telecommunications device and the use of an interactive computer service to send or display 'patently offensive' material to minors. The provisions also prohibited a person from knowingly permitting a telecommunications facility under that person's control to be used to commit these offences. However, Supreme Court in *American Civil Liberties Union v Janet Reno, Attorney General of the United States; American Library Association, Inc. v, United States Department of Justice* (the 'CDA Case', 1997) declared unconstitutional the above two statutory provisions as a violation of both freedoms of speech and personal privacy.

9.6.2 Internet Online Summit (December 1997)

One of the consequences of the US Supreme Court's rejection of the CDA in July 1997 was calling an online Internet Summit, entitled 'Focus on Children', to examine alternative strategies to promote children's interests online. The Summit's main focus was on the issue of appropriate content for children and personal safety. It also emphasised the need to enforce existing obscenity laws and laws against child pornography. At the Summit, the US Internet Service Provider ('ISP') industry announced its new 'zero-tolerance policy against child pornography, involving full cooperation with law enforcement agencies, and the use of the Cyber tip line also announced at the Summit. Strategies for specialist training for police officers in computer crime investigation were put forward.

9.6.3 COPA

In 1999 US Congress enacted Children Online Protection Act (COPA), which was very narrow in scope and covered only communications made for commercial purposes on the World Wide Web. Still, Supreme Court struck down the same in *Ashcroft vs American Civil Liberties Union* (2004).

9.6.4 CIPA

In 2000 Children Internet Protection Act (CIPA) was passed. This Act requires the schools and libraries to install filters on computers used by minors and adults.

9.6.5 FOSTA-SESTA

In 2019, the US government enacted a package of laws to curb sex traffic activities through the online platform by amending Section 230 of the 1996 Communication Decency Act. The enacted laws are FOSTA - the Fight Online Sex Trafficking Act, and SESTA - the Stop Enabling Sex Traffickers Act.

9.6.6 Other Related Legislation

The two legislations which need to be mentioned here are:

- i) Uniform Electronic Transactions Act, 1999 (UETA) - to remove barriers to electronic commerce by validating and electronic records and signatures. However, the substantive rules of the contract remain unaffected by it.
- ii) Uniform Computer Information Transaction Act, 2000 (UCITA)

According to UCITA, for a transaction to be 'Computer Information Transaction', the main focus of the transaction must be acquiring the computer information, access to it, or its use and not a mere incident of another transaction. The Act applies to contracts for developing or creating computer information, such as software development contracts and contracts to create a computer database. This Act does not apply to many cases where one person provides information to another person for another transaction, such as making an employment or loan application.

9.7 REGULATION OF CYBERSPACE CONTENT IN AUSTRALIA

In Australia, the growth in the use of the Internet and the concern for abusive content on the Internet led to the establishment of the Australian Broadcasting Authority ('ABA'), which was established pursuant to the Broadcasting Services Act 1992 by the Commonwealth of Australia for the regulation of broadcasting media in Australia. The ABA's 1996 report on the content of online services recommended in favour of a scheme of industry substantial self-regulation for online services with voluntary codes of practice supported by the labelling of online content using PICS and identified the advantage of PICS protocol in Australia. Following on from this Report, on July 15 1997, the Australian Minister for Communications and the Arts and the Australian Attorney-General announced 47 principles for a national approach to regulating the content of online services (Internet), 'inferring' towards the view that 'material accessed through online services should not be subject to a more onerous regulatory framework than 'offline' material such as books, videos, films and computer games. For the investigation into matters relating to the future regulatory arrangement of online services, ABA formed children and content online task force which works in three key areas (a) contact and safety issues, (b) illegal content and (c) unsuitable content areas that affect children and has also developed a set of practical recommendations, aiming to address this.

Broadcasting Services Amendment (Online Services) Act, 1999

This Act came into force on January 1, 2000. There is a provision for additional access prevention methods other than ISP blocking of overseas hosted material at the server level.

Online Safety Act, 2021

The Commonwealth Government has introduced a new bill Online Safety Act 2021, in the Parliament of Australia, to empower the various regulatory agencies to curb the loopholes in the current Internet content regulations.

The Act comes into force by January 2022 and empowers the eSafety Commissioner and other implementing agencies to implement online safety in a more harmonised manner.

9.8 REGULATION OF CYBERSPACE CONTENT IN EUROPEAN UNION

The approach of a large majority of (perhaps all) European Union Member States in dealing with illegal and harmful content on the Internet appears to be in accord with the 1996 recommendations of the European Commission advocating the use of filtering software and rating systems and encouragement of self-regulation of access- providers. In these countries, laws regarding illegal offline material, such as child pornography and racist material, also apply to Internet content. With regard to material unsuitable for children, the EU Safer Internet Action Plan covering the period 1999-2002 has a budget of 25 million euro and has three main action lines;

- Creating a safer environment through the promotion of hotlines, encouragement of self-regulation and codes of conduct,
- Developing filtering and rating systems, facilitation of international agreement on rating systems,
- Awareness: Making parents, teachers and children aware of the potential of the Internet and its drawbacks, overall coordination and exchange of experience.

General Data Protection Regulation, 2019

A strong legal initiative to facilitate and safeguard Data Protection of any individuals of the European Union. GDPR is considered to be the toughest data protection regulation in the world.

9.9 REGULATION OF CYBERSPACE CONTENT IN THE UNITED KINGDOM

In September 1996 UK Government issued the R3 Safety-Net action plan (now Internet Watch Foundation, IWF), developed by UK ISP trade associations and where it is agreed by the government involve industry for the establishment of complaints hotline related to take-down procedures for illegal Internet content, primarily child pornography. In February 2002, the IWF announced that it would henceforth also deal with “criminally racist content”.

9.9.1 Related Legislation in the UK

- 1) Data Protection Act, 1999 for the regulation of the processing of information relating to individuals, including obtaining, holding, use, or disclosing such information.
- 2) Electronic Communications Act, 2000 to facilitate electronic communications and electronic data storage.
- 3) UK’s main telecommunications regulatory framework was implemented through two main Acts of Parliament - the Communications Act 2003 and the Wireless Telegraphy Act 2006.

- 4) The UK is planning to implement a stringent Online Safety Act. The while paper was released in 2020, and the Parliament is likely to pass Act in the near future.

9.10 REGULATION OF CYBERSPACE CONTENT IN INDIA

In India, cyber laws are contained in the Information Technology Act 2000. The main objective of the Act is to provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as e-commerce, which involve the use of alternatives to paper-based methods of communication and storage of information to facilitate electronic filing of documents with the Government agencies.

Digital Signatures [Chapter II]

Any subscriber (i.e., a person whose name the Digital Signature Certificate is issued) may authenticate an electronic record by affixing his Digital Signature. Electronic record means data record or data generated image or sound, stored, received or sent in an electronic form or microfilm or computer generated microfiche.

Electronic Governance [Chapter III]

Where any law provides submission of information in writing or in the typewritten or printed form, it will be sufficient to comply with the law if sent in an electronic form. Further, if any statute provides for affixation of signature in any document, the same can be done by means of a Digital Signature.

Similarly, the filing of any form, application, or other documents with the Government Authorities and issue or grant any licence, permit, sanction or approval and any receipt acknowledging payment can be made by the Government offices by means of electronic form. Retention of documents, records, or information as provided in any law, can be done by maintaining electronic records. Any rule, regulation, Order, by-law or notification can be published in the Official Gazette or Electronic Gazette.

However, no Ministry or Department of Central Government or the State Government or any authority established under any law can be insisted upon acceptance of a document only in the form of an electronic record.

Regulation of Certifying Authorities [Chapter IV]

The Central Government may appoint a Controller of Certifying Authority who shall exercise supervision over the activities of Certifying Authorities.

Digital Signature Certificate [Chapter VII]

Any person may make an application to the Certifying Authority for the issue of a Digital Signature Certificate. While issuing such a certificate, the Certifying Authority shall certify that it has complied with the provisions of the Act.

Penalties and Adjudication [Chapter IX]

If any person without the permission of the owner accesses the owner's computer, computer system or computer network or downloads copies

or any extract or introduces any computer virus or damages computer, computer system or computer network data etc. he/ she shall be liable to pay damage by way of compensation not exceeding Rupees One Crore to the person so affected.

The Cyber Regulations Appellate Tribunal [Chapter X]

Under the Act, the Central Government can establish the Cyber Regulations Appellate Tribunal having the power to entertain the cases of any person aggrieved by the Order made by the Controller of Certifying Authority or the Adjudicating Officer.

Offences [Chapter XI]

Tampering with computer source documents or hacking with computer system entails punishment with imprisonment up to three years or with fine up to Rs. 2 lakhs or both.

Publishing of information, which is obscene, in electronic form, shall be punishable with imprisonment up to five years or with a fine up to Rs. 10 lakh and for second conviction with imprisonment up to ten years and with fine up to Rs. 2 lakhs.

[A detailed analysis of the Information Technology Act of India is explained in Unit 13]

9.11 INTERNATIONAL INITIATIVES FOR REGULATION OF CYBERSPACE

Today there is a need for an international framework of principles, guidelines and rules for global communications for the twenty-first century. In July 1997, the German government hosted an International Conference in Bonn on 'Global Information Networks' cooperation with the European Commission. It was attended by Ministers from 29 European Union, EFTA, CCEC and G7/G9 countries and by representatives of online content providers, access and service providers and users of online services. It resulted in the adoption of the 'Bonn Declaration' of the Ministers and declarations by industry and user participants.

The Bonn Declaration pointed in the direction of:

- 1) using current national legal frameworks for the enforcement of criminal law provisions where appropriate in respect of online crime;
- 2) development by industry of common principles for schemes of self-regulation regarding the content of online services; and
- 3) Establishment of national hotlines for complaints regarding online content and some appropriate interconnection and interaction between national hotlines.

Martin Bangemanns, EC Commissioner in her speech of September 9 1997, to the International Telecommunications Union in Geneva has pointed out that there is a need for an international charter for global communications, and in particular governing activities carried out over the Internet, could provide a suitable framework covering such issues as the legal recognition of digital signatures, encryption, privacy, protection against illegal and

harmful content, customs and data protection. The tools for achieving these objectives would include mutual recognition, self-regulation, and, if needed, regulation.

On June 29 1999, on invitation by Martin Bangemann, business leaders from around the world participated in a discussion on global communication issues, with the objective to explore the need for strengthened international coordination, which resulted in the formation of Global Business Dialogue. It was resolved that it should avoid legislation wherever possible and concentrate on market-led, industry-driven, self-regulatory models and any regulation to ensure competition. It should focus on a well-defined list of issues on which quick progress can be made with the close cooperation of business, consumer groups and governments of all countries who wants to participate and work on these issues should be industry-led and coordinated with relevant international bodies. The Transatlantic Business Dialogue and the US-Japan Business Council were two organisations closely involved in this process. Attendance at the first meeting of the GBD's Business Steering Committee took place in New York on January 14 1999. It consisted largely of major corporations from the United States, Europe and Japan. However, the issue of Internet content was not considered amendable to relatively fast solutions by the GBD, and so Internet content is not receiving immediate attention from this Group.

On February 27 1999, the International Network of Experts on Self-Regulation for Responsibility and Control on the Internet was held in New York. The Bertelsmann Foundation brought this network together, a charitable foundation that owns the controlling interest in Bertelsmann Corporation, the German media and publications enterprise, as a part of its advocacy of self-regulatory solutions to the problems of Internet content. The three regulatory agencies represented at the meeting were the Australian Broadcasting Authority, the Canadian Radio Telecommunications Commission (by Mr. Ted Woodhead) and the Singapore Broadcasting Authority (by Ms. Ling Pek Ling); all of which are actively dealing with the issues of self-regulation of harmful content on the Internet.

The above study reflects different legal policies in the world for regulating cyberspace and International efforts to deal with it. However, some sort of criminal penalties should also be there in all national laws for which coordinated criminal laws are needed to deal with illegal content on online services.

9.11.1 Organisation for Economic Cooperation and Development (OECD)

The OECD and international organisation working in the area of data privacy and information security established an ad hoc process of meetings (the first was on 1-2 July 1997 and second on October 22 1997) on approaches being taken in major industrial countries for the regulation of content conduct on the Internet. The meeting acknowledged the primary role of the private sector in regulating the Internet. However, at the joint OECD/Business and Industry Advisory Committee forum held on March 25 1999, in Paris, the OECD resolved to do no further work in this area. On April 19 2006, the OECD task force on spam recommended that Governments and industry

step up their coordination to combat the global problem of spam. It calls on governments to establish clear national anti-spam policies and give enforcement authorities more power and resources. The report notes that coordination between the public and private sectors is critical.

9.11.2 UNESCO

The United Nations Educational, Scientific and Cultural Organization (UNESCO) was founded on November 16 1945. At the 29th UNESCO General Conference held in Paris from October 21 to November 12 1997, the Director-General of UNESCO made a preliminary report on the feasibility of an international instrument to establish a legal framework relating to cyberspace. It recommended the preservation of balanced use of language in cyberspace, which represented the concern of non-Anglophone countries at the domination of English as the language of the Internet. Today, UNESCO functions as a laboratory of ideas and a standard-setter to forge universal agreements on emerging ethical issues: the organisation also serves as a clearinghouse for disseminating and sharing of information and knowledge while helping the Member States build their human and institutional capacities in diverse fields.

Let us now summarise the points covered in this Unit.

Check Your Progress: 3

- Note:** 1) Use the space below for your Answers.
2) Compare your answers with those given at the end of this Unit.

State whether the following statements are true or false:

1. In Australia, the government has mandated blocking access to content deemed unsuitable for adults.
.....
.....
2. In Korea, the government has no system of Internet content grading.
.....
.....
3. Australian Broadcasting Authority and Singapore Broadcasting Authority are the only two regulatory agencies in the International Network of Experts (Feb 1999).
.....
.....

9.12 LET US SUM UP

- There has been a rapid increase in the use of the Internet for various types of commercial transactions and consumer services.
- For the safe carriage and conduct of Cyberspace, regulation ought to be identified as appropriate and necessary.
- The necessity arises due to the expansion of economic and creative interaction, which led to disputes involving the acquisition, use, possession, processing and communication of information.

- The use of the Internet for obscene, indecent and pornographic content, rumour-mongering, viruses, cybercrime, the possibility of invasion of privacy of individuals all emphasised the need for cyberspace regulation.
- Legal policies in various countries like the USA, UK, European Union, and New Zealand show that in the context of regulation of Cyberspace, more emphasis is on self-regulation through the use of filtering/blocking technologies.
- There is a need for coordinated international guidelines and principles to regulate cyberspace.
- International organisations such as OECD and UNESCO can play an important role in framing the international regulatory framework for the Internet.

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9.14 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

Check Your Progress: 1

1. Yes, there is a need for the regulation of cyberspace. The use of the Internet for distribution of obscene, indecent and pornographic content, and child pornography; increasing numbers of business transactions through the Internet and issue of intellectual property rights; issues of privacy and emerging cybercrimes are major areas of concern today that point towards the need to regulate cyberspace.

Check Your Progress: 2

1. ‘Filters’ are software tools used to block access to unwanted material. Examples are E-mail Filters, Site Blocking Filters.

Check Your Progress: 3

- (a) True
- (b) False
- (c) False

UNIT 10: NEW MEDIA AND ETHICAL ISSUES

Structure

- 10.0 Introduction
- 10.1 Learning Outcomes
- 10.2 Definition of New Media Ethics
- 10.3 Rights and Ethical responsibilities of Content Creators
 - 10.3.1 Understanding Digital rights and Creative Commons
 - 10.3.2 Ownership Issues
 - 10.3.3 Copyright Infringement
 - 10.3.4 Open Content vs Free Content
- 10.4 Content Curation and Limits to Sharing
 - 10.4.1 Privacy and Other Ethical Issues
 - 10.4.2 News Related Ethical Issues
 - 10.4.3 Ethics for Online Marketers
- 10.5 Rights and Ethics of Online Readers
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- 10.9 Keywords
- 10.10 Check Your Progress: Possible Answers

10.0 INTRODUCTION

The advent of new technology has opened up a world of information for us. Internet, the World Wide Web, Smartphones, mobile applications etc., have made us familiar with terms such as New Media. Earlier, the distinction between new and old or traditional media was clear, but the constantly evolving technology has forced us to rethink the definition of new media. We have come a long way from a one-dimensional definition of the concept. New media is a broad term that carries multiple meanings and interpretations. Using new technologies and advanced devices for communication has created a scenario where we are constantly consuming online content. Today we spend much more time being 'logged on' than we have ever done.

New media is not only changing the way we interact with our surroundings; it is also dictating 'how' we do it. It facilitates sharing in a number of ways, including text, video, pictures, graphs, illustrations, audio etc., asking each user to engage with the online content more deeply and uniquely. The user

has to be able to make sense of all this information and understand the pitfalls of communicating online.

There is a range of activities such as emailing, video sharing, social networking, virtual gaming, and even hacking that can be done online. There are unseen attacks such as hacking, phishing and trolling that make our experience of the online world uncomfortable. Law means legal rules used to govern a country's matters. The Indian Penal Code defines the Indian penal system, and the Information Act 2000 is the guiding principle for new media in India. The IT Act and its subsequent amendment in 2008 take care of defamation, libel and slander apart from more serious online crimes such as phishing and fraud. But the huge amount of data uploaded cannot be controlled by laws alone, and the need of the hour is to understand new media ethics.

10.1 LEARNING OUTCOMES

After reading this unit, you should be able to:

- describe the different aspects of new media ethics;
- discuss the importance and challenges related to it;
- explore the responsibilities of users while accessing or downloading content; and
- use new media with greater care in your personal and public online conduct.

10.2 DEFINITION OF NEW MEDIA ETHICS

New Media ethics define how we behave online and help us decide about our 'netiquettes'. These are required because the information is being exchanged quickly and in huge amounts. Both consumers and producers of new media need to be aware of their ethical limitations in the online world. While there are legal rights to protect content creators, the policies for the consumers of online content are in nascent stages.

A great deal of content is being created online. It is important that the Internet remains open, transparent and protects the rights of individuals who contribute to the sharing and exchange of knowledge. This allows them to create content freely and fosters creativity while making knowledge accessible to everyone. The temptation to copy or modify easily available content is difficult to fight. The ownership, privacy, confidentiality and intellectual property need to be respected in virtual life just like in our real life.

Therefore new media ethics can simply be described as a set of ethical considerations that define our conduct online. New media ethics tell us how to appropriately use new media without breaching any law or infringing on the online rights of other users. They provide a model code for creators, distributors and users of online content.

Collaborative websites such as Wikis and YouTube, social media sites such as Facebook, MySpace, Weibo and Twitter are all running with the help of user-generated content. Individuals who are reading the content also share,

exchange, add-on and publish the data they come across and thus end up becoming the consumer and producers. This is unlike any other medium, e.g. we use Facebook to share pictures and 'like' pictures found on our friends' walls, thereby creating data. Thus, new media users need to be protected from ethical violations as producers and creators of information. Let us first try to understand their responsibilities as creators.

10.3 RIGHTS AND ETHICAL RESPONSIBILITIES OF CONTENT CREATORS

The Copyright Law protects individuals from having their work copied in an unauthorised way. In contrast, the Information Technology Amendment Act 2008 has a small section dedicated to dealing with cyber crimes such as sharing obscene material or impersonating on the Internet. Since the laws have not evolved as fast as the medium itself, it becomes imperative to follow the ethical guidelines strictly.

10.3.1 Understanding Digital Rights and Creative Commons

Digital Rights have become very important in this information age. The rights of both the content creator and consumer or reader need to be protected. There are many challenges here as consumers on the Internet are mostly prosumers (producer + consumer). They have to watch out for ethical violations both as creators and consumers of online content. Since establishing ownership is easier, the content creator's rights are always discussed more fervently. New techniques collectively referred to as Digital Rights Management (DRM) have evolved to protect these. They make it difficult to duplicate access or distribute data in an unauthorised way. We see some common techniques in everyday life: copy control, access control, and digital watermarking. When we use a watermark, there is a link to the original work embedded somewhere within the text to guide the reader to the original work. One can see websites where only a part of the information is free while one needs to be either a member or a paid subscriber to access the text, such as Google Books, SAGE etc. Some software controls are also designed to disable any copying and thereby automatically prevent data reproduction. More sophisticated techniques involve data encryption. The data is jumbled up and pieced together only by authorised persons with the decryption key, much like a jigsaw puzzle.

The major issues with respect to new media ethics for content creators are:

- Ownership and Copyright
- Open vs Free content and Content sharing
- Privacy and other ethical issues

10.3.2 Ownership Issues

The web shows information readily and what we need is available at one click. This is also true for pictures, music, graphics, songs and any other information that we seek. But that also throws up a concern about protecting our rights as creative people. Though the Copyright Law legally protects us, we are ethically bound by ownership and copyright issues on the web. There are new forms of copyright available online now.

10.3.3 Copyright Infringement

There are a lot of websites offering paid content online. This is done to ensure that artists/writers contributing content are compensated and motivated to contribute further. But some file-sharing companies allow illegal downloading and sharing of files that lead to piracy. The rampant music piracy or copying of digital goods such as audio files, videos, reports, articles and such without the consent of the person who holds the copyright is a major problem. As users, we tend to become careless about copy-pasting desired information and infringing upon fellow netizens' copyright.

10.3.4 Open Content vs Free Content

David Wiley has specified that online content can be both open and free. It is important to distinguish between the two. Any content available online that can be accessed, revised, reused, redistributed, remixed and retained for later use is referred to as open content. This means that the online content need not be 'open' even if it is free, implying that free content is not the same as 'open' content. Because free means one can access the content free of cost, but 'open' means users are free to download, edit and share the content without any ethical or legal limitations. Free content allows individuals to use and benefit from it, make and distribute its copies, study and apply it or even distribute its derivative works.

The problem of creating ethical guidelines for the Internet has risen because it is a relatively new medium. There is a vast amount of content floating around on the Internet, and there are many conventions that define our ethical boundaries with respect to using the content available online. The automatic copyright of the content posted online lasts for 70 years, after which it becomes available for public use. But new types of copyright licensing available online now tell us how a particular content should be used. Creative Commons is one such organisation working on the idea of providing people access to creative work and intellectual property while giving them a right to choose the conditions of making that work available to consumers. In simple terms, whenever a user puts up any fresh piece of information online, he/she can specify the way it has to be used by mentioning if the material is free for modification/download/sharing etc. or partly available/ not available. This is done via symbols and attributions that have now come to be used commonly on the Internet.

These guidelines are helpful in understanding how one must use content available online. However, it should be noted that licenses issued by Creative Commons are not a substitute for copyright. The table as an Annexure of this Unit explains the different types of copyrights from Creative Commons.

Check Your Progress: 1

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this unit.

1. Define new media ethics.

.....

2. What does Digital Rights Management mean?

.....
.....

3. Distinguish between Open and Free Content.

.....
.....

10.4 CONTENT CURATION AND LIMITS TO SHARING

The content writing style often keeps changing, and these days the major emerging trend is that of content curation. It is defined as a process of sorting, arranging and publishing data related to a specific theme together so that the reader gets more information about the same topic without having to click through multiple sites.

The work of curators is to pick the most relevant content and exhibit it so that a quick glance reveals the most relevant links at one place itself. It is unlike a search engine because here, the curator adds some inputs about the content to give the reader an idea about what the text carries and why they should click it.

There is a thin line between highlighting someone’s content and presenting it as your own. While curating the content, the appropriate links and credits must be provided along with the text. Though giving an embedded link to the original text is within permissible copyright limits, it could be misleading for the readers, causing an ethical violation. Therefore, the curators must make strong efforts to mention the original source and links explicitly.

10.4.1 Privacy and other ethical issues

The ethical constraints of content producers are also limited to the extent that they should not upload, distribute, share or misuse any content such as photographs, videos, music, articles, books, or any intellectual property acquired physically or virtually without the consent of the individual concerned. However, we often find a rampant violation of this basic new media ethic. Personal information of friends, relatives and acquaintances is often shared online without seeking explicit approval of the people in question.

10.4.2 News related ethical issues

All the content on news websites may not come from reliable sources and can also be inaccurate. In such cases, it is prudent that the users be informed when a news item is less reliable or has only been edited after taking from another source. This helps them to be better prepared to handle such information. In the case of images, new end technologies have facilitated easy capturing, sharing and transmission of data. Also, in many cases, the news may not be verified, or wrong images could appear besides stories, thus requiring the reader to be discerning.

The reports generated through anonymous sources and hoax data are also commonplace. During the second season of IPL, a blog named ‘Fake IPL

Player' was started. The anonymous writer was believed to be a Kolkata Knight Riders team member but could not be identified. Only after the writing caught international attention and garnered, a huge number of visitors did the blogger's identity get revealed. Before that, the team management had taken measures like curbing internet access and banning laptops from stopping the posts. This is the downside of information coming in through new media. It is impossible to ascertain the source and authenticity of the information correctly.

The problem is also faced by news employees who want to share their thoughts online. The companies are often not open to allowing this since it can lead to all kinds of problems. For instance, remarks of a person about a group or community could be hurtful and incite violence ending up spoiling the company's reputation. To avoid this, many companies have now come up with clear guidelines so that their employees can use social media fearlessly. They often spell this out as 'Social Media Policy. The leading publication Los Angeles Times has drawn up a social media policy for this very reason. It says that:

1. Principles of integrity, professionalism, privacy and impartiality should be observed by journalists when posting online.
2. The authenticity of what employees post is important. Online journalists should verify questionable content with credible sources before posting or tweeting about it.
3. It is important for employees to properly define their association with the publication as they would do offline.

Some companies such as Adidas go one step ahead and give clear instructions to the employees, as outlined below:

1. Employees are allowed to associate themselves with the company when posting, but they must clearly brand their online posts as personal and purely their own. The company should not be held liable for any repercussions the employees' content may generate.
2. Content pertaining to sensitive company information (particularly those found within Adidas internal networks) should not be shared with the outside online community. Divulging information like the company's design plans, internal operations and legal matters are prohibited.
3. Proper copyright and reference laws should be observed by employees when posting online.

Thus it is clear that both content producers and readers need to have a system of checks and balances for their online behaviour. Their etiquettes cannot be controlled but can be guided with the help of social media policies, and drawing up ethical guidelines etc.

10.4.3 Ethics for online marketers

Since users are increasingly connected with each other and keep sharing intimate information online, the marketers often reach them through advertisements that are specifically targeted as per their browsing history. This is done through cookies that track the data of users. They not only spoil the experience of the users but are considered unethical. The use of

hidden hyperlinks and contextual link ads is very annoying. There are also instances of companies floating paid reviews and sponsoring content that is favourable for them. This creates positive reviews for the product but is a gross violation of ethics since it is misleading for the readers. Sometimes malicious content appears in the form of pop up ads/ alerts, in-app clicks or download links. They may turn out to be viruses. The users need to take special care when dealing with such content.

Search engine optimisation is also used as a technique to gain users' attention. However, this is used indiscriminately to redirect users to the same sites repeatedly.

As per the **Institute of Advertising Ethics (IAE):**

- “All forms of advertising material must share the common goal of maintaining the truth and should be a means to serve the public.
- They should maintain a clear distinction between corporate communications, press releases, sales collateral and advertisements.
- A publisher must disclose every condition upfront and clearly, as the asterisks (*) and fine print at the end of the document can sometimes go unnoticed by the consumer.
- If cookies are being used to track and detect a user's settings, personal record and online activity, then this must be clearly stated before the user begins browsing your site.
- The placement of ads should not obstruct the user view, nor should they be disguised as editorial content.
- Finally, whether you are selling online or offline, advertisers must abide by the federal, state and local advertising laws.”

Check Your Progress: 2

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this unit.

1. What are the responsibilities of content creators in the online world?
.....
.....
2. How can one become more alert towards personal data being published online?
.....
.....
3. Why is social media policy important in the present context?
.....
.....

10.5 RIGHTS AND ETHICS OF ONLINE READERS

It is not just the content creators who need to be restricted by ethical boundaries; there are unwritten protocols for readers. Something as innocent

as ‘liking’ a page or tweeting on a trending topic can sometimes lead to a violation of online ethics due to the nature of the content. Other issues facing readers are cyber disinhibition, inadvertent self-disclosure, cybercrimes such as bullying, doxing, phishing etc. On the consumers’ end, especially social media users, the invasion of privacy is not fully understood.

Readers in the online world are still unaware of the data trails they willingly give into the hands of internet service providers and are thus falling into a situation where they have no control over their own data. The disclosure problem is compounded by the lack of awareness among Internet and new media users, which can lead to invasion of privacy.

The companies often dictate the terms of service and privacy policies of social networking sites as per their requirement, and readers have little or no say in changing them. They are also unaware of their virtual identities and how data-mining firms are being used.

Similarly, social networking sites often collect information and share it with third-party users. Still, users cannot control this since failure to accept these policies often results in being unable to sign up or access these sites and applications.

Thus, we reveal much more about ourselves online than we had planned to simply because we do not care to go through the privacy settings or disclosure agreements while downloading apps or accessing social media. The least a user can do is read and understand these carefully and limit the amount and type of personal information they upload. The increasing cyber disinhibition or the loosening of social restrictions and inhibitions in the virtual world is a major cause of ethical and legal violations.

Activity – 1

Check the privacy settings of the social networking site of your choice and list its salient features.

10.5.1 Instances of Ethical Violations

The new media is a powerful tool to reach out to people, but it is sometimes misused for personal attacks, running malicious campaigns with intended or unintended consequences. Trolling, cyber vandalism and smear campaigns are mounted on the Internet to garner quick support.

Sometimes these incidents go out of hand and create gross ethical and legal violations. For example, the pictures of the brutal murder of a northeastern student in the Munirka area of Delhi were shared online without any respect for the privacy of the individual or his family’s consent. Similarly, leaked pictures of film stars holidaying abroad caused a lot of annoyance to the persons concerned. In the above cases, we can hold the person who circulated the pictures legally guilty, but people who came across the pictures and shared them further indulged in gross ethical violations. In case any content being circulated on the net is found to be objectionable, it must be reported to the particular site and the authorities so that necessary action may be taken.

Another ethical violation is the trend of shaming videos. These are videos where people are humiliated with punishments such as chopping off the

hair, beating etc., as punishment and are recorded to be uploaded online with the motive of promoting online embarrassment. There have been reports of kids, teenagers and even adults feeling suicidal after their shaming videos came online. This disturbing trend also includes videos of pet shaming. Though they are intended to serve as a punishment, such videos often go 'viral' and can affect the mental and social health of persons concerned.

People of all age groups use the Internet, and not all users are discerning enough to understand the consequences of the data they may share online. Anything once posted on the Internet remains there forever and can be dug up any time later and cause embarrassment. Therefore we must be extra careful in putting up or sharing our pictures with friends and colleagues.

We often find the abusive and derogatory language used on web page comment sections, chat rooms and social networking sites, etc. This type of trolling results from disinhibition or breaking down of socio-cultural norms in the virtual world. Another big threat is the addiction to these sites. The overuse of apps and social networking sites is causing an alarming situation where the addicted users are psychologically more dependent on their virtual identities than on real-world scenarios. The ubiquitous 'selfie' also becomes a menace at times. Clicking a selfie at any and every minute of the day is not a crime. However, how, where and when it is clicked decides whether there has been an ethical violation or not. The former U.S. President Barak Obama faced a lot of flak for clicking a selfie at the funeral of Nelson Mandela.

As we look at the advent of the 'Internet of things, i.e., devices connected with the Internet that can be remotely operated, the responsibility of using the technology in a better way has also increased manifold.

10.5.2 Do's and Don't's of New Media Ethics

The guidelines for 'netiquette' are very simple. When we post something in relation to a text, we should point to the original text while commenting so that our post is not taken out of context. It is important that we are careful while posting any data online, and before doing it, one must consider the long term consequences.

We should be sensitive to the online readers who may represent different beliefs, sensibilities and cultures. If we have committed a mistake, we must immediately apologise and remove the concerned posted text. We should be gracious in disagreements too. Expressing any negative opinion online on a public forum can disturb any individual. Below is a list of things one can do to prevent unethical practices online.

Do's and Dont's of New Media Ethics

- "Do not open messages from strangers.
- Do not forward messages/rumours without first verifying the claims
- Do not impersonate individuals or secure their passwords through unauthorised means
- Never send pictures to strangers
- Avoid downloading copies of pirated software or movies, songs etc.
- Respect the privacy of others, just as you expect the same from others.

- Do not use other users’ computer resources without their permission.
- Use the Internet ethically.
- Complain about illegal communication and activities, if found, to Internet Service providers and local law enforcement authorities.
- Users should not intentionally use the computers to retrieve or modify the information of others, which may include password information, files, etc.”

10.5.3 Dealing with Ethical Violations

There are many pitfalls as far as ethical violations are concerned. Users may end up causing a lot of these and may choose to remain ignorant about them. For example, piracy of movies, TV shows and songs is very commonplace. People who download files through torrents or other means are well aware that they are causing ethical violations, but they do not think of it as a wrong practice. The Internet, which has facilitated many activities, has also heightened possibilities of falling into a ‘cut-copy-paste’ trap.

The foremost thing is that we should double-check the data we post online and be critical, observant and watchful while sharing content or talking to strangers. We should also encourage our acquaintances and friends to point out any inadvertent errors or mistakes we might have committed. As users of new media, we need to understand the constantly changing online world and figure out how to deal with emerging ethical challenges. We also need to draw up policies to ensure no conflict of interest between content creators and consumers online. The users need to be more aware of new crimes being committed online. Above all, we need to be aware of new media ethics and be willing participants in making the Internet a more productive, responsible and decent place for all users.

Activity – 2

Identify a recent instance of ethical violation on the Internet and discuss how it could have been prevented.

Check Your Progress: 3

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this unit.

1. What can readers do to safeguard their online experience?

.....

2. How can online ethical violations be prevented?

.....

10.6 LET US SUM UP

In this unit, we started with the definition of New Media ethics which were described as ethical considerations that define our conduct online that help us interact with people. We then moved on to the rights and responsibilities in the

online world in which it was explained that there are ethical considerations both as creators and receivers of information. The legal part is taken care of by Digital Rights Management, Copyright laws and Intellectual property rights. However, the ethical part is a lot more complex and is dealt with by a combination of different mechanisms such as Creative Commons and Social media policies. An important aspect of understanding online ethics and using content over the web is to learn to differentiate between 'open' and 'free' content. These were discussed in detail, along with some ethical violations and how these can be handled effectively.

Some guidelines for new media use and a roadmap for online conduct were outlined in the unit. Through the discussion, a strong need for awareness among 'netizens' regarding their rights and responsibilities in the online world and social media policies were emphasised.

It was stressed that new media users need to be careful about their personal and public conduct in the online space. This can be achieved by understanding the ethical constraints of new media users.

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10.9 KEYWORDS

New media ethics: Ethical guidelines for online behaviour.

Netiquettes: Convention for communicating in cyberspace is made from the word etiquette colloquially meaning ‘good manners’.

Wikis: Open and Collaborative content that is user-generated and can be edited by anybody.

Cyber Disinhibition: the phenomenon of breaking down of social and moral codes of conduct in the virtual world.

Content Curation: It is the manual sorting and arrangement of data available online so that the reader gets all related text in one place itself. This saves the reader time and provides customised yet varied content to readers without going through various links and websites.

10.10 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

Check Your Progress: 1

1. New media ethics are ethical considerations that define users’ online conduct. These help the consumers appropriately use new media technologies without infringing the rights of other users or breaking any laws.
2. Digital Rights Management (DRM) has evolved to protect the rights of online content creators. This help prevents the unauthorised duplication, access and distribution of data. Copy control, Access Control, and digital watermarking are some of the ways used for this.
3. Open content is online content that can be accessed, revised, reused, redistributed, remixed and retained for later use. At the same time, free content can be accessed without paying a fee but cannot be edited, revised or reused further.

Check Your Progress: 2

1. While using content, one should provide appropriate links and credits along with the text and explicitly mention the source. They should also not upload, distribute, share or misuse any content such as photographs, videos, music, articles, books, or any other intellectual property acquired physically or virtually without the consent of the individual concerned.
2. Personal information of friends, relatives and acquaintances is often shared online without seeking their explicit approval. One must respect the privacy and copyright of others while publishing content online.
3. Social media is designed to be an easy-to-use system for voicing our opinions. But there is a need to be aware of the new kind of dangers it exposes us to. Social media policies define the limits of actions that

can be performed on social media and thus help us follow responsible online behaviour - both as content producers and users.

Check Your Progress: 3

1. Social networking sites often collect information and share it with third party users. Although users cannot control this, it is prudent to go through the privacy settings or disclosure agreements while downloading apps or accessing social media. The user should read and understand these carefully and limit the amount and type of personal information they upload.
2. We should double-check the data we post online and be critical, observant and watchful while sharing content or talking to strangers. We should also encourage our acquaintances and friends to point out any inadvertent errors or mistakes we might have committed.

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