**Block 4**

**SUPPORT SYSTEMS, LEGAL AND ETHICAL ISSUES**

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EXPERT COMMITTEE

Prof. I. K. Bansal (Chairperson)
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NCERT, New Delhi

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IGNOU, New Delhi

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School of Education
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PROGRAMME COORDINATORS

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School of Education
IGNOU, New Delhi

Dr. Gaurav Singh
School of Education
IGNOU, New Delhi

COURSE COORDINATOR

Professor N.K. Dash, School of Education, IGNOU, New Delhi

COURSE PREPARATION TEAM

Unit 13 Dr. Nisha Singh
Deputy Director, IUC
IGNOU, New Delhi

Course Editing
Prof. Chandra Bhushan
Formerly with CIET, NCERT, New Delhi

Format, Editing and Course Coordination
Prof. N.K. Dash
SOE, IGNOU, New Delhi

Language Edition
Dr. Parmod Kumar
SOH, IGNOU, New Delhi

Proof Reading
Mr. Ajith Kumar, C
SOE, IGNOU, New Delhi

Material Production

Prof. Saroj Pandey
Director
School of Education
IGNOU, New Delhi

Mr. S.S. Venkatachalalm
A.R. (Publication)
School of Education
IGNOU, New Delhi

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BESE-135: Information and Communication Technology

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Unit 2 Scope and Evolution of Information and Communication Technology (ICT)
Unit 3 Learning Theories: Implications for ICT
Unit 4 Teaching-learning Systems

Block 2 TEACHING AND LEARNING RESOURCES
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Unit 13 ICT for Educational Management
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Unit 16 ICT: Social, Legal and Ethical Issues
BLOCK 4 SUPPORT SYSTEMS, LEGAL AND ETHICAL ISSUES

Introduction to the Block

As you know, there are several learning support systems like library, laboratory, etc. which play a crucial role in student learning. With the advent of ICT, these learning support systems have been digitalized. In this Block, we will discuss digitalized learning support systems and how ICT helps in educational management. Moreover, ICT for inclusive classroom and social, legal and ethical issues concerning ICT will also be discussed in the Block.

Unit 13 deals with use of ICT for educational management. The Unit explains the concept of educational management and the importance of ICT in educational management. It discusses various applications of ICT in school governance. Applications of ICT in managing various school data, records, administrative activities, students’ portfolio, assessment and evaluation have been discussed. We also discuss use of ICT in financial management and creating online community of parents, teachers and students for effective management.

Unit 14 focus on learning support systems. The Unit begins with a discussion on different learning support systems like library and laboratory. ICT based learning systems like digital library, virtual laboratories, virtual world, simulation, electronic mail and discussion forum have been discussed. ICT for sharing learning resources has been described with an example of NROER. In the end, we discuss various tools for collaborations such as Blog, and Wiki.

Unit 15 deals with use of ICT for inclusive classroom. In the beginning, the concept of inclusive classroom is explained. It is followed by description of the role and use of ICT in inclusive classroom. A detailed discussion on understanding and using assistive technology in classroom has been made in the Unit.

Unit 16 is concerned with social, legal and ethical issues pertaining to the use of ICT. We discuss social issues concerning ICT, and how learning resources available through ICT can be used in a fair manner. In this context, intellectual property, copyright in the digital world, plagiarism, privacy policy etc. are discussed. In the end we discuss impact of ICT on different socio-cultural issues like cyberbullying, Internet addiction, etc.
UNIT 13  ICT FOR EDUCATIONAL MANAGEMENT

Structure

13.1 Introduction
13.2 Objectives
13.3 Defining Educational Management and Administration
13.4 Importance of ICT in Educational Management
13.5 Application of ICT in Educational Management (E-Governance)
  13.5.1 School Management Tools
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  13.5.3 Record Keeping (Medical, History of Learners, Student Result)
  13.5.4 Paperless Administration
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13.6 Use of ICT in Financial Management
  13.6.1 Managing Students’ Fee Records
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  13.6.4 ICT for Resource Planning and Sharing
13.7 Creating Online Community of Parents, Teachers and Students for Effective Management
13.8 Let Us Sum Up
13.9 Suggested Readings and References
13.10 Answers to Check Your Progress

13.1 INTRODUCTION

ICT today offers umpteen opportunities for changes in various school related processes like learning, teaching and managing. Schools have to avail of these opportunities to bring in drastic changes in infrastructure, and improve skill-sets required by teachers and administrative staff to manage school functioning. ICT provides tools for addressing the problems of school system.

It goes without saying that ICT plays a vital role in improving the overall effectiveness of the school system. ICT-equipped schools are aptly called ‘Smart Schools’ today.

In this unit, we will discuss how ICT and its tools can help teachers and administrators improve and streamline their management system and its multifarious activities.

13.2 OBJECTIVES

After going through this Unit, you will be able to:
• explain the concept of educational management;
• provide an overview of importance of ICT for school administration and management;
• explain the use of enterprise resource planning (ERP) in education;
• describe the role of ICT in school record keeping and its maintenance;
• use various technologies for record keeping and scheduling;
• explain the role and functions of school management system (MIS);
• use ICT for financial management;
• use technology effectively for communicating with parents; and
• describe various government initiatives for use of ICT in education.

13.3 DEFINING EDUCATIONAL MANAGEMENT AND ADMINISTRATION

Let us understand the meaning of management and administration. To put it simply: Management involves five basic functions: planning, organizing, coordinating, commanding, and controlling. It can be applied across a host of areas and disciplines. As we may see that Planning is deciding for future and generating plans for action. Organizing is ensuring that human and non human resources are available; Coordinating is placing or creating a framework or structure in such a way that organization’s goals can be accomplished; Directing is assessing the amount and kind of work and getting people to do it; and Controlling is checking progress in context of the plans made during planning stage.

Administration and management are sometimes looked upon as synonyms, but the distinction between the two was pointed out by Oliver Sheldon (1923), who categorized administration to be decision making and management to be the executive function. The conflicting views on this show three main viewpoints:

i) Administration is a determinative function and Management is a executive function.

ii) Administration is part of Management i.e. Management is a generic term and includes Administration.

iii) There is no distinction between Management and Administration.

(Reference: Unit-1. MES-041; Growth and Development of Educational Management)

Management is pervasive and is needed in all areas of society. Educational Institutions are the places designated for providing learning experiences to learners in order to impart knowledge, skills, values, attitudes, etc. with the ultimate aim of making them productive members of society. Managing educational institutions, therefore, involve planning, organizing, directing and controlling the activities of an institution. The optimum utilization of physical and human resources is the main goal of educational management.

Educational Management needs managers with multi-skill sets. These include managerial; financial; accounting and budgeting; commercial; technical and security skills besides human skills.
Four kinds of important managerial skills are defined below:

1) **Technical skills**: These skills refer to the ability of a person to carry out a specific activity. The knowledge of methods, procedures and processes is very important for managerial supervision.

2) **Human skills**: These skills refer to the ability of a person to work well with other persons in the group: to lead; to motivate; create an environment conducive to accomplishment of assigned tasks.

3) **Conceptual skills**: These skills refer to the ability of a person to conceptualize abstract situations to understand and coordinate the full range of institutional objectives and activities.

4) **Administrative skills**: These skills refer to planning, organizing, motivating, directing, controlling and coordinating.

(Reference: Unit-1. MES-041; Growth and Development of Educational Management)

We will be studying about how ICT has influenced management of educational institutions.

### 13.4 IMPORTANCE OF ICT IN EDUCATIONAL MANAGEMENT

The field of education has seen rapid and exponential growth over the years. It has made administration and management of academic sector a complex task. The ICT and its various tools have tried to make changes in the administrative system to enhance its efficiency and efficacy. In this section, you will study about how ICT has changed administration and management processes in the educational system and how educational institutions are adopting e-governance and automated school management programmes. This needs capacity building of the stakeholders for its implementation.

### 13.5 APPLICATION OF ICT IN EDUCATIONAL MANAGEMENT (E-GOVERNANCE)

Educational management involves a lot of activities like admission, record keeping, resource management, etc. ICT plays a vital role in supporting all these activities in an efficient manner. It can be used right from student administration to various resource administration in an education institution.

ICT can be used for three major areas of educational management:

1) **Learner-related**: Admissions; registration / enrolment; time table / class schedule in electronic form; attendance of students; report card; hostel, transport, etc.

2) **Teacher-related**: Using ICT for teaching-learning activities, also in other areas like maintaining records, service rules, latest decisions from CBSE, NCERT, etc.

3) **School Functioning**: Recruitment and work allotment; attendance and leave management; performance appraisal; communication through e-mails, e-
Support Systems, Legal and Ethical Issues
circulars regarding official matters; scheduling / allocation of halls for examinations; application, processing and display of results of students; online fee payment.

13.5.1 School Management Tools

School management essentially involves interactions, communication between all the stakeholders like school management board, teachers, parents, staff, alumni, community members and others. School management is comprehensive term including school admissions, subject selection, course selection, class and teacher allotment, maintaining records, communicating with parents, preparing various certificates, analyzing various data, etc. School management involves all stakeholders in decision-making process. School manager is entrusted with responsibility of planning policies and their implementation and creating learning environment for students and nurturing their talents.

Thus school management involves many processes like planning, budgeting, accounting, school related processes like timetable, fee collection, staff management, resource management, communication with parents and community. Besides all theses, the school manager should keep himself/herself abreast with the latest developments in the school education, suggestions and guidelines of CBSE, NCERT and the Government of India. All this Herculean tasks need lot of time and energy. Thus to keep pace with time, a school management software would be of immense help for both administrative and managerial purposes. This is in sync with the Digital India movement as well in which digitization of processes is being encouraged to increase efficiency and transparency. A host of software options are available both in ‘proprietary’ and ‘paid category’ as well as free and open source categories.

It is for the school management to decide which suits them most. Here we will be discussing a few school administration software available free of cost.

- **FeKara**: FeKara, will manage your school as you want, from admissions to attendance and examinations to result cards. It is has a free version and a priced version. You may use these as per your need. It has modern administration and management features for educational institutions for learning, administration and management activities. It manages exams, assignments, budgeting and internal messaging. It is not completely free. It has both free and paid versions. The free version is for small schools. Additional data storage and other features are available on payment basis. (Website: http://fekara.com/)

![Fig. 13.1: Homepage Fekara](image)
• **TS School:** TS School is the short form of Time Software School. It is a school administration and management software which suits all types of schools. It has quite variety of modules for management. Like FeKara, TS School also has a basic version with features but full functionality and support is available for paid version. (Website: http://www.ts-school.com/)

![TS School](image)

**Fig. 13.2: Homepage of TS School**

• **Fedena:** Fedena is a free and open source school management software to efficiently manage students, teachers, employees, courses and system & process in educational institutions. It is based on ‘Ruby on Rails’, initially developed by a team of developers at Foradian Technologies. The project was made open source by Foradian, and is now maintained by the open source community. (Website: http://www.projectfedena.org/)

![Fedena](image)

**Fig. 13.3: Homepage of Fedena**

• **SchoolTool:** SchoolTool is a free, open source, web-based student information system. It has features such as customizable student and teacher demographics and other personal data; contact management for teachers, students, and their guardians; Teacher grade books; skill and outcomes based assessment; school wide assessment data collection and report card generation; class attendance and daily participation grades; calendars for the school, groups, individuals, and resource booking; tracking and management of student interventions. It has strong support for customization, deployment with regular updates.
SchoolTool was made with Python, and is run on Linux Ubuntu. It comes with its own web server and database. The only apparent drawback is that it is more teaching-learning oriented with teacher supportive features than for administrators like fees and accounting feature. (Website: http://schooltool.org/)

Open Admin for Schools: ‘Open Admin for Schools’ is a freely available, open source software package and is licensed under the GNU General Public License. Open Admin for Schools offers software features like attendance, reports, management system.

‘Open Admin for Schools’ is one of the most comprehensive free and open-source school administration software options available. Open Admin for
ICT for Educational Management

Schools is entirely web based tool. It is designed to be lightweight both in server resource requirements and in communication bandwidth. It currently has the following features:

- **Demographics**: It stores student and family information that can be viewed and printed in a variety of ways.
- **Attendance**: Attendance can be entered by authorized persons.
- **Discipline**: It maintains record of discipline related issues.
- **Report Card System**: The report card system is designed to report on student progress using up to 20 objectives per subject and an unlimited number of subjects. It can be integrated with attendance reporting, etc. Report cards can be printed as PDF reports with customization possible as per requirements.
- **Online Gradebook**: It allows teachers to enter marks and assessments online from school or home.
- **Parent/Student Viewing scripts**: It allows parents to view attendance and report cards.
- **A Fee System**: It allows charging of student fee, printing of invoices, payments, invoices and export summary transactions to external accounting programs.
- **Export/Import Modules**: It allows students to easily transfer schools within divisions without re-entry of demographic information. Export of data to other programs via an automated XML based transfer mechanism.
- **An Online Daybook**: It allows teachers to plan and view their lessons/days.

All these softwares are available for schools to choose from as per their need and convenience. Government of India has taken an initiative, ‘Shala Darpan’, which is a school Management software towards e-Governance.

**Shala Darpan** is an initiative to provide services based on School Management Systems to Students, Parents and Communities. The School Information Services include School Profile Management, Student Profile Management, Employee Information, Student Attendance, Leave Management, Report Cards, Curriculum Tracking Custom, SMS Alerts for Parents / Administrators on student & teacher attendance.

![Shala Darpan of Kendriya Vidyalaya Sangathan](https://darpan.kvs.gov.in/shaladarpan/)

**Fig. 13.6: Shala Darpan of Kendriya Vidyalaya Sangathan**

**Source:** darpan.kvs.gov.in/shaladarpan/
In the first phase of “Shaala Darpan Project” launched in June, 2015 covers 1099 Kendriya Vidyalayas through the National Informatics Centre Services Inc. (NICSI). Rajasthan has already started it, so has Gujarat. Other states are also considering and have shown their willingness regarding introduction of similar system in the State Government Schools.

Check Your Progress

Notes: a) Write your answers in the space provided.
   b) Compare your answers with the one given at the end of the unit.

1) State whether true or false:
   i) Shala Darpan is social networking site ............................
   ii) Management, involves five basic functions: planning, organizing, coordinating, commanding, and controlling ........................
   iii) Open Admin for Schools is Learning Management System ......
   iv) Fedana and SchoolTool are School Management Software ......

13.5.2 Database Management Using ERP for Teachers, Parents, Students and Staff

Database management is one of the important components of educational management as it helps decision making for future and has influence on policy making. It is now being done through the use of ‘Enterprise Resource Planning’ (ERP) which is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete all the organizational processes.

An ERP system is based on a common database and a modular software design. The common database allows every department of an organization to store and retrieve information in real-time. The modular software design means that the organization may select the modules as per their needs without overloading the system with unnecessary modules.

In fact, ERP is used in all types of organizations, be it educational or business; big or small. Institutions use many modules like finance, resources, etc. for effective management in ERP but it needs at least two or more modules integrated as one common database for the system to be called ERP. As ERP brings in efficiency in managing any system, it is very useful in educational institutions. Educational institutions have large number of individuals and as different category like students, teachers, office staff, laboratory staff, etc., managing and tracking the roles, responsibilities and the performance of all is a tremendous task, which can be efficiently tackled by educational ERP.

ERP in educational institutions have many advantages. Let us discuss a few:

- **Cost effective:** It is cost effective in terms of time, and money. The time consuming processes like fee collection, deposition, record maintaining and most important information retrieval can be easily managed by the ERP.

- **Better organization of data:** Since data management is the core of ERP, it allows institutions to organize, reorganize and maintain data in forms where we can retrieve it at any time as per our need and requirement.
ICT for Educational Management

- **Security of data:** It is ensured through firewalls and other security measures. The backup in ERP also ensures that we do not lose data at any time.

- **Automation of basic administrative processes:** It is possible as ERP is integrated, the data processing and retrieval is easier and manageable, thus reducing time and manual time and efforts.

- **Management friendly:** As ERP software for education is more automated, it takes less time for data processing. This also helps in analytics which helps the management to take decision on hard facts than presumptions.

- **Supports pedagogy:** As time is saved, teachers are less burdened with nitty gritty of attendance, and other data and thus can focus more on enriching pedagogical methods. It can be productively used for better teaching-learning in classrooms.

The one thing which overshadows all the advantages of ERP is its cost which is prohibitive for small educational institutions. It may prove cost effective in the long run, but the planning and customization is not cost effective for small enterprises.

Another shortcoming is the technical aspect which may appear complex and hard for new users. Thus most ERPs, in practice, are not easy to learn and use. This necessitates continuous user training to ensure optimum benefit from ERP.

In nutshell, we can say that its overall advantage overrules the issues of cost and skill development.

### 13.5.3 Record Keeping (Medical, History of Learners, Student Result)

Records for any organization are important documents which provide insight into its developmental process over a period of time. Records are meticulously maintained in schools as they are evidences of the growth of children over a period of time.

School records are the information of the academic (scholastic and co-scholastic), administrative (non-scholastic) and other related activities in the school and which are directed towards growth and development of the school.

School records are kept in the form of documents, files, books, CD-ROM, Hard disk and now in cloud. School records are official authentic documents of an action, or an event occurring in school, which the school administration and management considers to be important for posterity.

They include reports, list and data of official happenings related to school and are preserved by school administration in school office. In fact, they are the official transcripts which are considered important by the school administration and management. Therefore, it is imperative that every school must maintain its records systematically for easy validation of its activities organised for growth and development of the school.

**Importance of school records:** School record is as important to a school as is history important to society. School records tell the history of the school and are useful historical sources for future generations. Thus it provides continuity when
the administration changes over a period of time. School records even help in
guidance and counseling services as they provide detail of all round growth and
development of students. Thus academic, personal, and career counseling can
effectively be provided. Not only for guidance by counselors, school records
provide information to parents and guardians enabling them to be partners in all
round development of their children/wards. The continuum of learning
environment in school and home is very important for balanced development of
the child.

School records also provide information about the ‘pass out’ students which is
sought by employers or other higher education or related institutions for admission
or placement.

The school records also help the management to plan for the optimum
development of schools. The school records also help education departments
and ministries in policy making and decision making. It also provides empirical
data to supervisors and inspectors of school to make objective assessment of the
functioning of schools especially, teaching and learning.

Some Important School Records

Admission Register: It is a permanent and important record book of all the
students who are admitted to the school and thus should be maintained and
handled carefully and kept in safe custody.

The admission register maintains all the information of the learners like birth
certificate, grade card/mark sheet of the last class attended, transfer
certificate(TC), etc. All these documents are carefully examined and entered in
the admission register. After entry, the documents are preserved and maintained
in record keeping storeroom.

As this is an important document, which is referred to again and again by
authorities inside and outside school, the entries are carefully done and regularly
supervised by seniors. In fact, this is referred to, even in court of law, for issues
like date of birth.

Admission register also maintains the exit of the student, if there has been any
withdrawals due to any reason. Thus, it also shows the details of education and
progress of each pupil in the school. The admission register should contain the
following items and any other may be added as per the requirement of the school
administration: serial number and name of the pupil; father’s name, caste,
occupation and address along with mobile and e-mail id; date of birth; date of
admission to the school; class to which student is admitted; transfer certificate
(in case the admission is in senior classes than the first class); date of withdrawal
or migration from the school.

Attendance Register: The attendance register is an important record book in
which the presence or absence of students in each and every class and section in
the school is recorded on a daily basis. This must be maintained and kept securely
by every school.

This record is maintained by the class teacher on individual class and section
basis. The attendance is marked at the beginning of the school time. The name
of pupils admitted to the class and section are listed and the presence and absence
of the pupil is marked in ink. It is a practice that absent students are marked in red ink. The holidays are also marked in red ink too. No column is left blank as this may be misused later. Every school has its own policy for absenteeism and if the student is absent without leave for more than certain period, the admission may be cancelled or names of students may be struck off rolls. Concisely, its main function, as its name suggests, is to show the presence and absence of every student enrolled in the class. It is good for quick reference regarding regular students and helps in evaluation of learners. It involves calculations like average daily attendance.

**Log Book:** The log book is a systematically maintained record of events that occur in the school over a period of time. They may be maintained session-wise so that a historical chronological record of the school events which have significant effect on the school’s activities is maintained. For example, an orientation for parents held at the beginning of the academic session, visit of an expert, officials from Department of education, should be noted down in the Log book. It should be maintained by the head of the institution or a senior person deputed by the Head and supervised by the Head of the school. It is often seen that the state inspectors of schools usually inspect Log Books during their visits so that they can know school events at a glance.

**Visitors Book:** As the name suggests, it is a record of the visits of important personalities, which include officials from the department and ministry of education, or other related government agencies or any other school related visitors. In fact, old alumni are also welcomed by school and are invited to put their comments in the visitors’ book. Their opinions and suggestions may be very helpful for improving the working of the institution.

**Staff and Students’ Personal Files:** It is necessary that the school should have as much information on every teacher and student as possible without violating their privacy.

**Cumulative Record Card:** Students’ cumulative record card keeps all the information of the students’ development over the period the student is in the school. It documents students’ cognitive, affective and psycho-motor growth and development which are cumulatively recorded and maintained in this card. It gives a comprehensive picture of the growth and development of an individual student. This is especially helpful in guidance and counselling. As it is cumulative record, it is developed year by year and is transferred to another school in case the student leaves one school and takes admission in another school.

**Students’ Report Sheet/Card:** Student’s report card contains information about child’s progress in academics. It is regularly and periodically sent to parents for information sharing. It also contains child’s participation in school activities, his/her general behavior in school, his/her health condition, participation in curricular and co-curricular activities and other important information.

**Staff Time Book and Movement Book:** It is maintained for information as to when staff members report and or leave school or office. It promotes regular attendance and punctuality. It also helps in checking truancy and gross indiscipline in staff. Now-a-days, electronic devices are commonly used for marking attendance and departure time for all employees.
Library Records: Library records are maintained separately by the Librarian, like stock register, issue register, etc. In fact, today many of the routine activities of Library are done using library management software. CDS/ISIS which stands for Computerized Documentation Service / Integrated Set of Information Systems; Koha is the free software library automation package. In use worldwide, its development is steered by a growing community of users collaborating to achieve their technology goals. Koha is a Full-featured ILS in use worldwide in libraries of all sizes. Koha is a true enterprise-class ILS with comprehensive functionality including basic and advanced options. Koha includes modules for acquisition, circulation, cataloging, serials, authorities, flexible reporting, label printing and much more.

Stock Register: It has the record of all equipments and materials available in the school including the laboratories. It also keeps information of all the movable property of the school. After the purchase of an item, it must be entered in the stock register and the unique number allotted to it in the register, is also marked on the equipment. This is to be supervised and verified at least once a year by the school Head. The verification helps to identify the missing items, if any, or damaged items which can be sent for immediate repair or replacement.

The register should contain the information as mentioned in the columns of Table 13.1:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Article</th>
<th>Quantity</th>
<th>Date of Purchase</th>
<th>Name of Supplier</th>
<th>Purchase Order Details</th>
<th>Signature of Authority</th>
</tr>
</thead>
</table>

Property Register: It is used to keep full records of permanent and non-consumable items of school property.

Cash Book: It is a record of all money transactions occurring day-to-day in the school. Money received by the school from different sources like fees, fines, donations, stipends, scholarships, grant-in-aid, etc. are entered on the credit side. On the debit side, the payments like the salaries of the teachers, stipends, scholarships, contingent expenditure incurred, deposits made in the Treasury, bank and post office are shown. Balance is shown in red ink. It should be regularly written and the day’s business should be closed with the signature of the Head of the school. It is a record of financial transactions in schools. It gives information about income and expenditures. It promotes accountability and prevents corrupt practices. It should be kept up-to-date always.

Potential of ICT in Record Keeping: School records can be effectively and efficiently maintained with the use of ICT such as computers, digital libraries, e-mail, Internet and so on in which information are stored and disseminated. ICT ensures easy availability of information and its retrieval.

School record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination. It enhances and enriches communication, decision-making and problem solving ability in the school system. It is, therefore, necessary that this process be as accurate and accessible as possible.
Record keeping involves Database management by professional persons. The softwares like MS excel, MS Access, MySQL, Fox Pro, etc. may be used to maintain Database in schools as it reduces data redundancy, data inconsistency and ensures data security and data sharing.

### Check Your Progress

**Notes:**

a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

2) List records that help in understanding the growth and development of students.

3) List the entries made in stock register.

4) List any two database software.

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### 13.5.4 Paperless Administration

Paperless administration (or a “paper-free” office) means a ‘work environment’ in which the use of paper is eliminated or greatly reduced. Thus, a paperless environment would mean converting documents and other papers into digital form.

The paperless administration saves money, time and space. It makes information retrieval and sharing easier. It also boosts productivity besides saving time from paper work. Not only the cost of paper is eliminated in monetary terms, its environmental implications are ruled out.
With the current practice of computing on mobile devices, the use of paper in official works is steadily decreasing. This may be attributed to a generation shift; younger people are believed to be less inclined to printed documents, and more inclined to read them on a full-color interactive display screen. The initiatives of Government of India like “Digital India”, “Digilockers” and “travel tickets in digital form”, have helped in moving towards paperless environment. The goal of paperless administration in schools can be achieved through the use of ICT.

One of the tasks that schools face is allocation of duties to the academic and non—academic staff on periodic basis.

13.5.5 Allocation of Duties Among Teachers and Staff

One of the tasks that schools face is allocation of duties to the academic and non—academic staff on periodic basis. Thus, scheduling of duties and roles to all teachers and staff members is crucial to efficient school management. ICT helps in creating a schedules that maximize instructional time, provide time to meet the needs of the school students, provide time for staff to meet, plan, organize various curricular and co-curricular activities of the school. Use of scheduling tools ensures that the school resources are optimally utilized and schools function efficiently.

The scheduling and allocation of duties to teachers and staff needs annual and semester-wise scheduling. Thus, there is need to plan and schedule for one academic year called as School Calendar. This may be further specific as ‘Teaching time table’ and ‘Examination time table’. The co-curricular or extra-curricular activities and the meetings with parents through PTAs may be allocated time.

Many software tools are available which help in allocation of work without overlapping. We discuss two of commonly used tools: Google Calendar and FET time table software.

Google Calendar: Google Calendar is web-based time and task-management online application that allows for access to calendars via web browsers.

It can be used to create calendars for school activities that may be shared with all stakeholders like staff, parents, teachers, and students. It has many provisions, for example, reminders of scheduled activities can be sent via e-mail, text message, or pop-up messages within a web browser. This helps in ‘no missing’ or overlapping of work or time schedules.

Schools can use Google Calendar to manage time, coordinate projects, and share events with others. Academic departments, student clubs, and study groups can create and share Google Calendars. There can be schedules for classes and for individual users as well. There are many ‘view options’ like day, week, month, and year view of the calendar.

Teachers can create assignment schedules, project schedules, etc, to inculcate in learners the habit of timely submissions besides appreciating time management. For learners, Google Calendar offers a way to view up to date class information and helps in collaborating with others.

There are some software for generating schedules and timetables.
FET: FET is free software for automatically scheduling the timetable of an educational institution. It is free software, open source, licensed under GNU/AGPL. The term FET is the abbreviation of ‘Free Evolutionary Timetabling’. It is based on C++. Liviu Lalescu of Romania developed this timetable generator in 2003. There is continuous upgrade in the software, the latest being done in August 2017. The focus of updates are user friendliness and scheduling large variety of activities of all groups (classes/courses/students).

Some of the features of FET are:

- fully automatic generation algorithm, allowing also semi-automatic or manual allocation.
- platform independent implementation.
- import form XML format; CSV format.
- export into HTML, XML and CSV formats.
- flexible student structure, organized into sets: years, groups and subgroups.
- allowing overlapping years and groups and non-overlapping subgroups. You can even define individual students (as separate sets)

Time generation is done once all the relevant data of year, group, category, class, etc. are added. It can be generated in two ways: ‘new’ or ‘multiple variants’. Similarly, view of timetable also has student view, teacher view, room view. Thus, it becomes easy to sort and plan activities.

Timetables can be viewed using web browser. They are saved in html format.

(For details: http://timetabling.de/manual/FET-manual.en.html)

13.5.6 Students’ Portfolio

Portfolio is collection of artifacts of an individual which showcases individual’s set of abilities. When it is created or showcased in electronic form, it is called e-portfolio. It shows the e-learning path and the progress of the learner as one goes learning more and more complex tasks. It facilitates the integration of learning as students connect learning with outcomes. It helps them understand their own learning.

Student’s e-portfolio includes any form of learning outcomes like text files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the learner’s abilities and platforms for self-expression. If maintained online, it can be maintained dynamically. It is a type of learning record that provides actual evidence of achievement.

E-portfolios can be of different types:

i) Developmental portfolios: They exhibit the development of student’s skills over a period of time. They are like ongoing portfolios. They can be used for regular interaction between teacher and students and includes both self-assessment and reflection/feedback elements.

ii) Assessment portfolios: They showcase student’s competence and skill learnt over time and are refined enough to be evaluated. These are for end-of-course evaluation of student’s performance.
ii) **Showcase portfolios**: They demonstrate exemplary work and student skills on completion of the programme and have best outputs by the student. Students typically show this portfolio to potential employers to gain employment at the end of a degree program.

In all types of portfolios, self-reflection is very important for ensuring a rich learning experience that e-portfolio development can provide.

In many areas of knowledge like Art, creative writing, evaluation is done mostly through portfolios as it is considered to be a purposeful compilation and reflection of one’s work, efforts and progress. Portfolio is considered both as a learning as well as an assessment tool.

**Tools for creating e-portfolio**

Any tool, which has the potential to showcase the artifacts, can be used for creation of e-portfolio. A simple portfolio can be created using presentation software like PowerPoint. There are many online and offline portfolio tools. One of the open source e-portfolio tool is Mahara, which is a fully featured web application to build your electronic portfolio. You can create journals, upload files, embed social media resources from the web and collaborate with other users in groups. It may be downloaded from [https://mahara.org/](https://mahara.org/)

**Activity:**

Browse through some sample online e-portfolios. Create an e-portfolio showcasing two of your artifacts.

### 13.5.7 Managing Assessment and Evaluation

The examination process has undergone a revolution with the advent of ICT making it more effective and efficient. Use of ICT in evaluation involves the use of digital devices to assist in the construction, delivery, storage or reporting of student assessment tasks, responses, grades or feedback. ICT is used to create tests, record, provide immediate feedback, give grades, analyze them students’ responses with reference to the quality and relevance of student’s response besides helping teacher with learners analytics. Nowadays, ICT based assessment can be used to test a wide range of abilities and skills in students. Still there are a few skill-sets, especially in the affective domain, which might not be suitable for assessment through ICT. But this list is fast diminishing as more innovative uses are coming in. The use of Virtual Labs has helped students learn and their performance can also be assessed in virtual labs.

Geoffrey Crisp (2011) in the Teacher’s Handbook on e-Assessment stated that the ICT based assessment can be undertaken:

- through many devices, such as traditional desktop computers or laptops, or portable communication devices such as smart mobile phones, iPads.
- by using a multitude of formats, including text documents or portable document formats, multimedia formats such as sound, video or images; it can involve complex simulations or games;
- in groups or individually by students.
- in synchronous or asynchronous manner.
Christine (2013) identified two conceptually different approaches to assessing Key Competencies using ICT. On the one hand, Computer-Based Assessment (CBA) approaches use multiple-choice questions, while on the other hand, technology-enhanced learning environments offer a promising avenue for embedded assessment of the more complex and behavioral dimensions of Key Competencies, based on Learning Analytics.

Many tools are available to design and development assessment online for learners.

**Content Authoring tools:** They also have inbuilt options for creating, administering and grading quizzes, and other formats of question for assessment as learner progresses through e-content. Tools like eXelearning, xerte, adapt and Learner Activity Management System (LAMS) are open source authoring tools and can create many assessment types like cloze, multi select, multiple-choice, true-false, fill-in the blanks, matching, drag and drop, etc.

**LMS based Assessment tools:** Learning management systems (LMS) like Moodle have functionality of creation, administration and management of question banks and items. The type of tests available are quite varied like essay, matching, embedded answers (cloze test / gap fill), multiple-choice, short answer, numerical, true/false, drag and drop, jigsaw, ordering, multi select, etc.

**Assessment tools:** There are assessment creation tools which can be used to create assessment which can be used innovatively by the teacher. Some of them are described here.

i) **The Hot Potatoes suite:** It is freeware which includes six applications, enabling you to create interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web.

ii) **Rogô:** It is a complete assessment management system developed by University of Nottingham. It can be used to create and administer online assessments. This online system supports the full process from question and paper creation to the analysis of examination results and creation of reports. The question types can be multiple-choice questions (MCQ), multiple-response, extended matching, flash interface, fill-in-the-blank, image hotspots, labeling, likert scales, ranking, script concordance test (SCT), text boxes, and true-false. It can be used for formative as well as summative examinations, surveys and several other examinations.

**Activity:**

Find out two more assessment tools and make a comparative analysis of the features of these tools.

These tools can be used for continuous assessment as well as term end or final examination. There can be many variations to use online assessment and it is up to the teachers and administration to use appropriate ICT tools for conduct of examination. The concept of on-demand examination and walk-in examination is possible only due to use of ICT tools in examination.
Financial management is crucial for well-being of any educational institution, be it a school/college/university. For effective functioning of the school, adequate funding for day-to-day needs is very important as well as for planning its growth and development. Finances lie at the pivot of any activity school undertakes. Any error in financial management has ripple effect on all the activities of the school. This has serious implication on the teaching-learning activities as well.

The school principal is the authority for the day-to-day financial management of the school. The responsibility of monitoring and controlling school expenditure as per the sanctioned plan and budget lies with the school principal. The principal in turn report, on financial management, to higher authorities like to a board of trustees in case of private management or to officers in Directorate of Education of the Government in case of Government schools. The maintenance of financial records and their reporting is to be done by the principal.

13.6.1 Managing Students Fee Record

The unit responsible for fee collection is one of the most significant units of a school. Earlier all fees were collected manually and fee days were allotted for each class and section. Thus manual collection of fees involved handling of a lot of cash, issuing receipts and entering records. It was time consuming both for administration and parents. Thus fee management is one of the most important aspects of financial management of a school. ICT has influenced the way school fees are collected and managed.

The School Fee Management System: The School Fee Management System allows for fast data entry and faster voucher printing. It also allows for flexible fee structures so that multiple types of fee heads can be managed efficiently. It allows for creation of multiple fee schedules as per the need of the individual and the system. There must be multiple user logins with strict security and permissions.

The fee management system can generate all variation of invoices needed in the system like monthly fee invoices; student wise fee invoices; class wise fee invoices; penalty invoices; paid/non-paid status reports; and generate auto invoice/reports; print invoices/vouchers in PDF, Excel format; discount on fees/fine

As discussed in earlier section, the fee module is part of many school management softwares, thus having integrated information and reporting with attendance module.

Open Admin has Fee management wherein fees can be collected as per context or a pre-defined slab or category.

The School Fee Management System of Open Admin for Schools is user friendly and does not need high technical skills. A user can create fee structures, enter fee dues and receive payments. All the fee transactions are automatically updated in the system and integrated user updated information is created and updated which may be availed at any point of time.

In some systems, provision of online payment is there and thus facilitates both the parents and the management as the physical management of the cash is to be handled, sorted. Thus, depositing in bank is reduced.
13.6.2 Managing School Budget

One of the main components of financial management of schools is the preparation of school budget. It helps in matching the finances available with the planning of development. It is also the process of allocation of the available resources to the prioritized needs of an organization. The budget is part and product of planning process. Since utilization of budget involves legal matter, the responsibility of utilizing budget is bestowed on competent authorities of the school. Preparation of school budget is an important activity of school administration. For a school, preparation of school budget is important for both planning and evaluation of
Support Systems, Legal and Ethical Issues

School activities. It links school goals with instructional plans. For example, an activity based instructional plan will require budget provisions for the resources and infrastructure for conduction of the activity in the class. The link between instructional goals and financial planning is critical to effective budgeting.

There are softwares available for preparation of budgets for schools like School Budget Programme. It is a stand-alone solution that is designed to assist schools with the task of tracking department budget allocations that are dispersed among various teachers. It is tailor made for schools, and provides facility to track and manage departmental budgets. SBS Online is another budget management tool for education. It is secured cloud-based budget management system, incorporating budget planning and monitoring in one. It has provisions of planning, report generation; salary, budget monitoring, etc. It has provisions of contextualization as per the requirement. Another software is HCSS Budgeting, which has been exclusively designed by finance specialists dealing with education and helps schools and academies plan how to utilize their money. It can be used to forecast budgets up to five years in advance and allows schools to plan for changing circumstances, such as cuts in funding or increases in staffing cost. Schools and academies can use the software for day-to-day management of budget but it can also help with deficit recovery. HCSS Budgeting also links seamlessly with our accounting package i.e. HCSS Accounting, to allow finance teams to track real-time spending against planned expenditure.

13.6.3 Accounting

Information and Communication Technology (ICT), as in other fields, has significant applications in Accounting. Account management is one of the most important functions of the financial activity. It helps in developing a systematic system to record financial transactions properly and to track them accurately. The entry of ledgers and cash books manually is replaced by the use of computers. Accounting software are available to keep track of single financial transaction and to report it whenever the need be.

There are many accounting software. An Accounting software stores and manages all data regarding the bank transaction as well as collection of student fee or any expenses. Details of vouchers and imprest money as well as total income and expenses are managed precisely by the accounting software module. A school accounting software easily maintains details of student fees, employee expenses, school expenses and covers all the financial activities. It provides an efficient solution to management of accounts.

GnuCash is a personal and small-business financial-accounting software, freely licensed under the GNU GPL and available for GNU/Linux. It is powerful and flexible and still easy to use, GnuCash allows you to track bank accounts, stocks, income and expenses. As quick and intuitive to use as a checkbook register, it is based on professional accounting principles to ensure balanced books and accurate reports. It has features of QIF/OFX/HBCI Import, Transaction Matching; Reports, Graphs; Scheduled Transactions; Financial Calculations; Double-Entry Accounting; Stock/Bond/Mutual Fund Accounts; Small-Business Accounting; Customers, Vendors, Jobs, Invoices, A/P, A/R. It can be downloaded from https://www.schoolforge.net

Free and open source software is SQL-Ledger® ERP which is a double entry accounting/ERP system. Accounting data is stored in a SQL database server. For
the display, any text or GUI browser can be used. The entire system is linked through a chart of accounts. Each item in inventory is linked to income, expense, inventory and tax accounts. When items are sold and purchased, the accounts are automatically updated.

Many School Accounting software are proprietary software which are easily available and may be used as per requirement. Some of them are black baud; School Accounting, Zoho books, MySchoolAccounting. SlickPie has free version as well as paid version.

13.6.4 ICT for Resource Planning and Sharing

The use of ICT in resource planning and sharing necessitates management of ICT infrastructure. This infrastructure comprises a set of hardware, software, services, procedures, processes and persons. The infrastructure is not separated but it interacts with environment both physical and human for its optimum use.

One of the initiatives of Government of India is E-Pathshala. It has been developed by NCERT. It showcases and disseminates all educational e-resources such as textbooks, audio-video programmes, periodicals and a variety of other print and non-print materials through website and mobile app. The platform addresses the dual challenges of reaching out to a diverse clientele and bridging the digital divide (geographical, socio-cultural and linguistic). It offers a comparable quality of e-contents and ensures its free access at every time and every place. All the concerned stakeholders such as students, teachers, educators and parents can access e-books through multiple technology platforms i.e. mobile phones (android and windows platforms), and tablets (as e-pub) and on web through laptops and desktops (as flipbooks).

All the NCERT books have been digitized and uploaded on E-Pathshala. Currently, the e-contents are available in Hindi, English and Urdu. States/ UTs are being approached to digitize and share all textbooks in Indian languages through this platform in a phased manner. Both web portal and Mobile App of e-Pathshala are available to all for use. (http://mhrd.gov.in/ICT-Initiatives-e-Pathshala).

ICT Managed School Processes

As discussed in the above sections, school should adopt ICT for their administration and management i.e. adopt or adapt e-governance.

This will automate many school administration processes and thus there is need to build capacities for its implementation. The school based Management Information System (MIS) should be strengthened for optimum planning. It should be comprehensive, integrated and sustainable. The MIS will have all details of resources so that their use and sharing is possible both within the school and with other schools. The school local area network (LAN) can help in automating the school processes. A school local area network will help in automation of many office processes like maintenance of records, student related process, resource mapping, planning, sharing and using of existing resources. This will save on cost, time and effort.

These school based MISs will be integrated with the ‘state- wide web’ based School Education Management Information System.
This in turn will be linked to a nationwide network of all schools wherein teachers, students, school managers, and the community would participate for collaborating and sharing digital repositories of tools, content and resources; professional development and continuing education platforms; and guidance, counseling and other student support services.

Thus, the integrated School Management Information System (School MIS) will emerge as a single window portal where all resources and other information related to the secondary school system are located for all to access and benefit from.

Such a Management and Information System (MIS) helps in research and analysis activities as well as planning and policy related issues. MIS facilitates universal access to information, content and resources.

The Central Board of Secondary Education (CBSE) developed a support system called ‘Saransh’ with a vision to improve children’s education by enhancing interaction among schools and parents. This support system assists them in taking best decisions for their children’s future (MHRD).

This tool allows schools through the available data analysis to identify areas of improvement in students, teachers and curriculum and take necessary measures to implement change by comparison of results.

The mobile App for Saransh was also launched in 2015 which enables the parents and students to look at and compare their results vis-a-vis school, state and national level. In fact “Saransh” was conferred with the e-India 2015 Award for ‘Best Government Initiative in Education’ (http://mhrd.gov.in/ICT-Initiatives-Saransh).

Another initiative ‘I-share for India’ which is an initiative for creation of educational resources pool for School and Teacher Education, includes mobile enabled Apps / Web based ICT supplementary resources of school education and teacher education in any Indian language.

**Check Your Progress**

Choose the correct answer:

5) E-portfolio can be used for
   a) Assessment
   b) Developmental
   c) Showcase
   d) all of the above

6) E portfolio creation tool is
   a) Mahara
   b) Skype
   c) Kaizala
   d) All of the above
7) Which of these is not a tool for educational assessment?
   a) Hot Potato
   b) Audacity
   c) Rogo
   d) eXeLearning

8) Which of these is MHRD initiative for creation of educational resources pool?
   a) I-share
   b) Saransh
   c) Shala Darpan
   d) GIS mapping

13.7 CREATING ONLINE COMMUNITY OF PARENTS, TEACHERS AND STUDENTS FOR EFFECTIVE MANAGEMENT

It is often rightly expressed that the interaction between parents and teachers can together bring in all round development of a child. Therefore, communication between these two pillars of student development is very important. Therefore, sharing school activities with parents not only generates awareness and understanding among parents of the process and stages of development of their children but also they feel more connected to the growth and development of their children. This also makes them take an active role in the learning and development of their children.

Thus this communication and interaction between teachers and schools, and among parents is essential for building trusting relationships between two pillars of child’s growth and development. This cultivates parental involvement in schools which has a positive impact on optimum, all round development of children. The synergy between the two has important impact on their future.

This communication between teachers and parents has been there since long, but was intermittent through monthly or fortnightly Parent-Teacher Meetings (PTMs). This used to be one time interaction between parents and teachers and a continuous flow was missing.

With the advent of ICT, the scenario has changed a lot. There is a continuous interaction between the parents and teachers over various means of ICT. This has improved parental interest and involvement in schools’ activities. Schools are investing more and more time, money and energy in the use of technological means of communication. Mobile, computer, internet have penetrated our lives and thus their uses are helping us in better communication amongst us. The home and the school are using more ICT devices. Similarly both teachers and parents are using and being more apt at using the electronic communication devices. The rise of social media, and mobile apps has made contact and communication almost instantaneous. Thus, ICT has helped in building and strengthening the home-school partnerships, which have helped in improving
the educational activities in schools besides increasing the satisfaction of parents and the community with schooling of their children.

In fact all agree that parents’ involvement in their children’s education is a key factor in their children’s all round development. Though there exists a wide range of parental participation -from low or no attention to too much attention, a teacher should strike a balance between ranges of parental participation so that students are encouraged to learn at all places, be it school or the home.

The point of communication between the parents and the schools could be many. It could be physical face to face interaction or through letter, or other means about which we will learn a little later. Let us first try to understand the zone/sphere of communication between the parents and the teachers or the schools.

- Parents are expected to provide safe, healthy learning environment for the children to further their learning they acquired at school. This reinforces the concepts learnt at school and the children learn more efficiently. Schools conduct counseling sessions, workshops to make parents aware of the need to extend healthy learning environment at home as well. Further schools are also to find ways to encourage parents’ involvement in children’s assignments and homework.

- The school calendar has to be communicated to parents periodically, enabling them to know the activities and programs at school so that they can keep track of the children’s progress a home.

- Parents are encouraged to take part, children’s various school activities like career talk, betterment of the school ‘s effort to foster holistic development of children.

- There is also provision of parents’ involvement in decision making, and in governance of school.

ICT plays a vital role in communicating and collaborating among schools, parents and the community. It has a whole range of tools to accomplish this role effectively. You certainly know about some of the tools which students, teachers, and parents frequently use these days to communicate and collaborate among them. Let us discuss some of these here.

**SMS and Instant Messaging:** Schools these days use SMS to pass information to parents about the attendance status of their wards. This enables the parents to know whether the child is missing the school and/or is playing truant. SMSs can be sent collectively to all parents if a common message is to be sent to all parents, otherwise individual SMSs can be sent as per the need and the context.

Now-a-days, instant messaging service like ‘WhatsApp’ is increasingly gaining popularity among teachers, students, and parents. Its character of simplicity and synchronous communication makes it easy for sending information to parents. In fact, WhatsApp group has already become a collective community platform for all to share information or discuss any issue.

**Website or Blog:** At present it is mandatory for all CBSE schools to have and maintain their own websites. Essential information of the school such as: contact information, objectives, infrastructure, school rules, time table, staff lists etc.
are clearly shown on the school website. The website should also show the monthly and yearly calendar with useful information about school trips, parent teacher meetings, get together evenings, and a map with pictures of activities with learners and teachers, etc.

Besides creating their own websites, some schools use free blogging services from Google and Wordpress to create Blogs which regularly disseminate important information to parents, students and public in general.

**E-mail Services:** E-mail has really revolutionized the way letters are sent and received. It has reduced the time considerably. Schools create a database of e-mail ids of parents and send regular updates, and information. This is especially useful for those parents who do not visit website or blogs regularly. Class teachers can collect the e-mail addresses at the time of admissions and keep on updating and sharing the data with others on a common database.

Some schools have their e-Newsletter sent to all parents. This has a twofold effect. one-the students involved in preparation of NEWSLETTER learn the skills of collecting, screening, editing, composing, writing, etc, and secondly, the parents are kept informed of what is happening in the school.

E-mails can also be used by teachers whenever they need to communicate with students and/or parents. This may be used both for good news as well as problems faced by children.

The advantage with e-mail is that it can be integrated in LMS and the child’s contribution to and reflection on learning through chats, discussion forums can be mailed to parents as well.

**Learning Management Systems (LMS) and Virtual Learning Environments (VLEs):**

LMS, as the name suggests, is a system which manages the content and the teaching-learning activities organized online. LMSs have own inbuilt communication modules to interact with teachers and learners, which in turn can be monitored by parents at home. MOODLE is one of the popular open source LMS. You can easily explore the features of MOODLE from its website at www.moodle.org. Many schools are using LMS for keeping the parents updated about the teaching-learning processes in school. Schools use MOODLE to inform parents about teaching-learning happening in their wards’ classess.

A VLE is a software system designed to create online learning environment. This supports teaching and learning in an educational setting. It needs good Internet connection to support online classes. Online classes are not generally organized by schools but other features like assessment, discussion forums, and assignments are done through the VLE. Learning analytics and the tracking tools help teachers to provide learners help at the right time.

**Social Networks.** Schools also use social media like Facebook, Twitter or Instagram to communicate with parents. Since children use these sites, parents get to see and keep track of the sites children find pleasure in. Facebook is a social networking site which allows members to share information, pictures, etc. individually or in group pages. The privacy settings can be adjusted to make it open to public or keep it private. Thus, it is possible to make groups class-
wise, theme-wise on Facebook and share information with each other. It is user friendly site and many parents already have a Facebook account. An interesting website to teach parents to use Facebook is [http://facebookforparents.org/](http://facebookforparents.org/).

**Media Sharing:** There are a number of sites, which may be used for sharing media with each other. **YouTube** is the most common and widely used video sharing site. Schools can explore its use to communicate with parents by sharing videos on different awareness programmes, videos related to child rearing practices, soft skills, etc. **Podcast** is another important media which can be listened to while doing daily routine activities. School related audio programmes, motivational and informational talks may be shared through podcasts. Many podcasting sites are available on the Internet and they may be explored. Similarly, slide presentation by teachers, management as well as parents may be shared through slide sharing sites like **Slidehare**. Images, which could be school related programmes, proceedings of new events, etc. may be shared on [wikimedia](http://wikimedia.org), [flickr](http://flickr.com) or other picture sharing sites.

**Online Groups and Forums:** Online groups or forums are very important way of communicating and building community of like-minded people. In the context of school, parents, teachers, students can form online groups. Communicating with community members and parents are made easy using forum and e-mail groups like Google groups and Yahoo groups. Schools can create specific group of parents using Google or Yahoo services to communicate with each other and among parents. It is also possible to share files among the group members.

Thus, the above ICT tools can be used for creating a community which will facilitate learning in schools, homes and the community.

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<thead>
<tr>
<th>Check Your Progress</th>
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<tbody>
<tr>
<td>9) MOODLE is a</td>
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<tr>
<td>a) Online survey tool</td>
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<tr>
<td>b) Open Source Learner Management System</td>
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<td>c) Budgeting software</td>
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<tr>
<td>d) security device</td>
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<tr>
<td>10) VLE stands for</td>
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<tr>
<td>a) Value Loaded Environment</td>
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<tr>
<td>b) Virtual Learning Exercise</td>
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<td>c) Value Learning Environment</td>
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<tr>
<td>d) Virtual Learning Environment</td>
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<tr>
<td>11) Which of these is not a social media tool?</td>
</tr>
<tr>
<td>a) WhatsApp</td>
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<tr>
<td>b) Facebook</td>
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<tr>
<td>c) FETA</td>
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<tr>
<td>d) Instagram</td>
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13.8 LET US SUM UP

ICT plays a vital role in improving the functional effectiveness of educational system i.e. school management. Management involves five basic functions: planning, organizing, coordinating, commanding, and controlling. It can be applied across the area and discipline. Educational Management needs managers with multi-skill sets. Broadly, ICT can be used for three major areas of educational management: Learner related like admissions; Teacher related like using it for teaching-learning activities; and School Functioning like recruitment and work allotment. School management involves many processes like planning, budgeting, accounting, preparation of timetable, collection of student fees, staff management, resource management, communication with parents and community. There are many school management software like FeKara; TS School; Fedena; SchoolTool: Open Admin for Schools, which help in organizing information and making its retrieval efficient. Government of India has taken an initiative- Shala Darpan which is school Management software towards e-Governance. Enterprise Resource Planning (ERP) brings in efficiency in managing any system; it is very useful for school management. It has many advantages like being cost effective; better organization of data; security of data; automation of basic administrative processes; management friendly; supports pedagogy. In fact, school record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination for the purpose of enriching communication, decision-making and problem solving ability in the school system. Using ICT in keeping school records helps to facilitate and enhance the administration of the school towards achieving the goals. Scheduling software like Google Calendar can schedule meetings and events with co-workers, just as old calendar application. Students’ portfolios are used for self assessment as well as term assessment. Many ICT tools are available to design online assessment. It is also useful in financial management like for budgeting, accounting. ICT tools like email, social media are being used to create online community of parents and teachers.

13.9 SUGGESTED READINGS AND REFERENCES

- Open Admin for Schools retrieved from https://www.schoolforge.net/education-software-download/open-admin-schools

13.10 ANSWERS TO CHECK YOUR PROGRESS

1) i) False.  
   ii) True.
Support Systems, Legal and Ethical Issues

iii) False
iv) True

2) Cumulative Record,

3) Name of the article; Quantity; Date of purchase; Name of Supplier; Purchase order details; Signature of Authority

4) MS Access; MySQL.
   1) D.
   2) A.
   3) B.
   4) A.
   5) B
   6) D
   7) C
UNIT 14   LEARNING SUPPORT SYSTEMS

Structure

14.1 Introduction
14.2 Objectives
14.3 Learning Support System
   14.3.1 Library
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14.1 INTRODUCTION

In schools, classroom teaching constitutes the primary means of imparting student learning. While organizing teaching-learning, teacher makes use of a host of learning support systems available in school. These learning support systems supplement to what teacher teaches in the classroom. Some of these learning systems are library, laboratory, etc. Although these learning support systems have been contributing to student learning in conventional ways, their efficiency and effectiveness have increased with the use of ICT. In this unit, we will discuss various learning support systems and ICT based learning support systems.

14.2 OBJECTIVES

After going through this Unit, you will be able to:

- explain the role of learning support systems in school;
- describe various learning support systems in a school;
- describe ICT based learning support systems;
- explain the digital library and searching techniques in digital library;
- discuss the use of interactive tools for learning support;
• describe use of virtual lab and simulation in teaching-learning process;
• discuss ICT for sharing, learning resources in education; and
• explain Tools for Collaborations in teaching and learning in education.

14.3 LEARNING SUPPORT SYSTEM

Learning support system refers to any system which provide academic resources to support student learning in educational institutions. In the context of school, there are a number of learning support systems. Both teachers and students make use of these learning support systems to optimise their teaching-learning activities. Let us discuss library and laboratory which constitute two important learning support systems in a school.

14.3.1 Library

As we all know, library provides an effective learning support and thus plays an important role which is necessary to achieve the learning objectives of a curriculum. In fact, school library is the most effective support resource of providing materials and services for resource-based learning. Library helps the learners become autonomous by way of independent and self-study.

Importance of Library

Books are friends and treasure houses of wisdom. They give us pleasure and lead us to great heights.

The need for a good library service in a modern school is known to all of us. All thinking people, who are informed of the purpose of education, nature of the learning process, curriculum and the instructional process, and procedures in today’s schools, agree on the important contribution which library services make to the character and quality of educational programmes. Schools that have a good library service usually have better instructional programmes than those without an effective library service.

With the changed concept of education as a process of self-education, where the teacher’s role is largely to be of a guide and a facilitator, the role of library has assumed major importance. The modern trend in education is to encourage students to collect, on their own, information from various sources. From this point of view reading in a library itself is a part of school education. A library is indispensable for such modern methods of teaching as problem-solving method, project method, assignment methods, supervised study, etc. Thus, a library is the hub and centre of intellectual activity in a school and plays the same part, for all subjects, as does a laboratory for science subjects, or a workshop for technical subjects.

According to the Education Commission (1964-66), a collection of books, even a collection of good books does not constitute a library. A library should be the centre of intellectual life of a school, available at all time for reference, for study and for private reading. It should be a quiet place, provide an environment which encourages study and reading, and furnished and equipped for comfortable use.

Yet, not all schools have recognised important part which a library plays if more modern techniques of teaching are utilized to provide education and growth of
children. In some cases, library facilities are generally inadequate or totally lacking, while in other schools, there is constant effort to improve facilities so that the library becomes the focus of many instructional activities.

In schools, the textbook is an important means of learning for teachers and the taught. It provides a specific approach to pass on information and knowledge as briefly as possible. While it has advantages, there is a serious drawback in it. With total reliance on a textbook, teachers and students can limit their thinking to whatever material is available in the textbook. With today’s procedures of teaching-learning, textbook material is not considered sufficient. Supplementary reading, both on the part of the teachers and pupils, is essential. Besides using library by themselves teachers must motivate and stimulate pupils to undertake independent study and learn to use the resources that a library has. In modern times library is an essential educational aid and proper use of it must be made.

Source: (IGNOU, 2000)

14.3.2 Science Laboratory

Every school should have a well equipped science laboratory to aid instruction and stimulate greater interest in science courses. It provides an opportunity for actually applying scientific theories. We are living in a technological age and the cultural and educational value of science is being recognized increasingly. No school can ignore efficient science teaching.

Our aim is not to stuff minds of pupils with mere facts of science but to develop in them the application, ability, skills of experimentation, construction, inculcating scientific attitudes, interests, appreciation etc. One of the important functions of a science laboratory is the deepening of students’ understanding of scientific concepts and then their application.

Let us now discuss the importance of a laboratory.

Importance of a Laboratory

- Things learnt by the students through purposeful activity are permanently affixed in the minds of the pupils.
- Knowledge imparted without experimental evidence remains superficial.
- It provides opportunity for training in scientific method.
- Pupils learn to observe, collect data, analyse data, handle equipment etc.
- While performing practical work they learn to cooperate, become resourceful, take initiative, become self reliant.

Students learn to operate instruments and various apparatus. They also learn to repair them, if and when required. Source: (IGNOU, 2000)

14.4 ICT BASED LEARNING SUPPORT SYSTEM

Learning support systems in school such as library, laboratory, etc. have been greatly transformed with the use of of ICT. ICT based learning support services such as digital library, virtual laboratory, e-content repository, e-mail, Internet, etc. are increasingly being used by schools. Let us discuss ICT based learning support services in the coming sections.
14.4.1 Digital Library

An increasingly large amount of information is available in electronic format such as e-book, journals, articles and reference materials. Libraries are providing access to this information in digital form. Digital libraries are emerging in the world. In this section, we will discuss the digital library and its functions.

A digital library is a collection of digital objects that include text, visual material, audio material, video material, etc. stored as electronic formats. Digital libraries can vary immensely in size and scope, and can be maintained by individuals, organizations, or affiliated with established physical libraries, or institutions, or with academic institutions. The digital content may be stored locally, or accessed remotely via computer networks.

Digital Library of India

Digital Library of India (DLI) project started in early 2000 with the vision to archive all the significant literary, artistic and scientific works of mankind and to preserve digitally and make them available freely for everyone over Internet for education, study, appreciation and for future generations. DLI is a digital collection of freely accessible rare books collected from various libraries in India. It is aimed to provide learners a free-to-read, searchable collection of one million books, predominantly in Indian languages. The Project was initiated by the Office of the Principal Scientific Advisor to the Government of India and subsequently taken over by the Department of Electronics and Information Technology (DeitY), Ministry of Communications and Information Technology (MCIT), Govt. of India.

Digital Library of India has currently 550,585 books with 191,657,791 pages (191.632 Million approx.) in Portable Document Format (PDF). There are 231,379 books comprising 64,208,401 pages of Indian languages available on DLI website.

One of the goals of the Digital Library of India is to provide support for full text indexing and searching based on OCR (optical character recognition) technologies available. The availability of online search allows users to locate relevant information quickly and reliably thus enhancing student’s success in their research endeavors. This 24x7 resource would also provide for language processing research in areas such as machine translation, optical character recognition, summarization, speech and handwriting recognition, intelligent indexing, and information retrieval in Indian languages. (http://www.dli.ernet.in/)
You can use these electronic resources for teaching your students. Some of the electronic resources available in digital libraries are e-books, e-journals and databases.

**e-Books**

Many books are available these days in electronic format, either accessible on the net or on a desktop PC or devices like tablets, mobile phone or PDA. Usually the e-books are available in HTML or PDF format. There are many commercial e-book providers/vendors. You can get access to many e-books through different websites such as: websites of Project Gutenberg, Online Book Page, Free Books, and the Digital Library of India.

**e-Journals**

The number of electronic journals available in the world today is increasing at a fast rate. The e-journals come in different editions, such as an electronic version of print journals, or electronic only journals. Publishers of most journals today provide online access to their collections either free with print subscription or for payment of any additional amount. You should check the online access to different journals subscribed in your library. Though many e-journals are also available in the commercial domain, a large number of e-journals are also available as “Open Access’ and free. You can access e-Journals for classroom teaching as well as for your professional development. Some of the open access online journals sites are Directory of Open Access Journals (DOAJ), Open J-Gate, HighWire Press, etc.

**Databases**

Libraries subscribe to full-text database and/or databases on indexes/abstracts either in CD-ROM or online. These provide access to huge amount of information, and make searching and access to quality information easy. Most of the time, the databases come in specialized areas, and therefore, you should check the availability of electronic databases in your subject of interest in your library. These are highly useful for research. We shall discuss searching and using the databases in the next sub-section.

**Searching Catalogues or Databases**

The library catalogue is a list of books and other documents in a library. It provides multiple search access to the users. Normal access points for a document covered in library catalogues include the author, title, subject headings, editors, series information, etc. Sometimes the catalogues are arranged according to three separate groups, viz. author (including editors), title, and subject headings. Whatever may be the type of catalogue; the information is arranged in alphabetical order. So, if you have information on any of the basic access points for a document, you can directly go to the library catalogue and search the same. The library catalogue shall show you the location of the book/document through the call number (classification number + book number) of the book displayed on the card. These days, the library catalogues are available on computers and the card catalogues are disappearing. The use of computer for cataloguing has brought the Online Public Access Catalogue (OPAC) to the users through a desktop computer and/or available on the Internet. Here the OPAC is also a database/bibliographic record of documents available in the library. Databases provide us a range of search options based on ‘string search’. The string search is also
called keyword search, but while searching databases, we can also use a variety of criteria to limit the search and increase the preciseness of the results. Some of the search criteria used are:

- Author
- Title
- Key Words
- Journal name
- Publisher
- Date
- Publication type (books/journals/CD)
- Type of record (full-text/bibliographic data), etc.

The following are some of the guidelines to search databases:

i) Use a proper name or district phrase. If you know the exact phrase, enclose it in double quotes, e.g. “eco-feminism”.

ii) Use Boolean operators: AND, OR, NOT e.g. Child AND Labour AND India will cover Child labour in India.

   “Distance learning” OR “Distance education” OR “Open learning” will cover open and distance learning/education.

   “Cars NOT Red” will result in “Cars that are not red”.

iii) Use proximity, truncation and wildcards, e.g. Proximity searching with NEAR: “Journals” NEAR “Open Access” to cover Open access Journals

   Truncation searching: Study shall cover students, study, studying, etc.

Wildcards used in variation of spelling cases; Analyse to cover analyse and analyze.

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**Check Your Progress**

**Notes:**

a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

1) Explain learning support system.

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2) List the searching criteria of digital library.

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14.4.2 Virtual Laboratories

A virtual laboratory is simply ‘a laboratory experience without the actual laboratory’. Physical distances, costly equipment and limited expertise often put constraints on performing experiments. However, it is possible to develop web enabled experiments for remote operation. The virtual labs generally comprise a user-friendly, graphical interface, working in synchronization with a back-end, consisting of a simulation-engine running on a server or actual measurement data or a remotely triggered experiment. The central activity in any lab is running experiments and collecting data. For this to succeed, a real virtual lab must include real experiments from which students can collect data that are not pre-defined in any way.

A virtual lab could simply be a set of ‘simulations’ put together in the form of Java applets, flash-based demos or interactive animations where student could manipulate various parameters of the simulation and observe the results. The other option could be a virtual lab space where users can create their own experiments by arranging objects/equipment, or remotely connect them together, modify their properties and observe and collect data.

1) The iLab project at MIT provides an open portal to selected remote laboratories at MIT. Through this portal, students, educators, and self learners are given unrestricted access to some of the MIT iLabs. The vision is to create a worldwide network of shared laboratory instructions and educational materials. It is dedicated to the proposition that online laboratories (real laboratories accessed through the Internet) can enrich science and engineering education by greatly expanding the range of experiments that students are exposed to in the course of their education. http://openilabs.mit.edu/

2) The ChemCollective virtual lab. A Java applet based lab that allows students to design and carry out their own experiments. It is a National Science Foundation funded project, organized by a group of faculty and staff at Carnegie Mellon University for college and high school teachers who are interested in using, assessing, and/or creating engaging online activities for chemistry education. ChemCollective “Virtual lab,” allows students to design and carry out their own experiments while experiencing representations of chemistry that go beyond what is possible in a physical laboratory. (www.chemcollective.org).

3) Cogs. NASA's virtual lab, Connecting a Generation to Science (cogs) is a place for integrating virtual lab to classrooms and provide downloads to access a variety of advanced microscopes and specimens. The Virtual Lab is a suite of microscopes and multi-dimensional, high-resolution image datasets. It is freely available to teachers, and students. The virtual lab includes:
   - The Fluorescence (Light) Microscope (LM)
   - Scanning Electron Microscopy (SEM)
   - Atomic Force Microscope (AFM)
   - Energy Dispersive Spectrometer (EDS)

The virtual lab software allows you to access, select, and download from a range of specimens requested by science teachers. There are also tools that
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allow you and your students to annotate, measure and save images. The virtual lab can be used on computers without the purchase of any additional equipment or access to the Internet. (http://www.nasa-inspired.org/cogs/Cogs_learn.htm)

4) Rice Virtual Lab in Statistics is an excellent place to learn statistics that uses interactive multimedia, simulations and case studies to learn statistics. See http://onlinestatbook.com/rvls.html

5) The Virtual Lab at Stanford University: Started in 1998, the virtual lab media library at Stanford University has many programs for students learning in areas related to Physiology, Biology, Immunology, Brain, Health education, etc. (See http://virtuallabs.stanford.edu/)

14.4.3 Virtual World

“A virtual world is an internet-based, simulated environment where users interact via ‘motionable avatars’, graphical images that represent people” (Antonnacci et al. 2008). Use of a virtual world can foster collaborative learning, and give opportunity to carry out tasks that could be difficult in the real world. Since the virtual worlds are 3-D environments, they can be used in a variety of ways:

- Discovery learning by clicking on objects
- Reinforcement of learning by offering a repository of learning aids and tools
- Collaborative workspaces, encouraging informal discussions
- Traditional instructor-led learning at a distance
- Simulated learning by modeling a process or interaction that closely resembles that real world.

The virtual worlds are platforms enabled by multi-user three dimensional (3D) software environments to provide an effect of real world scenario. Most discussions on virtual worlds today focus on Second Life (see http://secondlife.com). However, there are other virtual worlds such as Kanewa (see http://kanewa.com/), Twinity (see http://www.twinity.com/en), The Palace (see http://www.theplace.com/), etc. These virtual world environments provides broadly four characteristics (Robbins-Bell, 2008):

- Persistence: A virtual world can’t be paused; it exists whether or not a user is logged in.
- Multiuser: A virtual world must be populated or at least have the potential for population.
- Avatars: Rather than offering an icon to represent a user, a virtual world allows a user to create an agent that takes action, an avatar that can perform actions on the request of the user.
- Wide Area Network: A virtual world is facilitated via a wide area network rather than a local machine or a network of workplace.

Virtual worlds show potential and promise for improving teaching and learning by motivating and stimulating the learners through engagement and immersion in the learning event/process. So, it is believed that virtual worlds can be used as a constructivist approach (Coffman and Klinger, 2007). The virtual world
environment such as Second Life (SL) provides opportunities for both the student and the teacher to create and manipulate objects in the virtual environment leading to a dynamic and rich learning environment. Subjects like History of Marine Science could be taught using virtual world that would have ‘real effect’ of teaching in the past or going down the sea. In the learning process, the individual students, through their personalized avatars should also be engaged in discussion, debate, designing and decision-making as in a real world. Robbins and Butler (2009) present a pedagogical model for choice of virtual world as learning platform. They present taxonomy of virtual worlds (first person simulations, gaming worlds, emergent worlds such as the SL, and task worlds). They further go on to use teaching (objectivist – constructivist) and learning (declarative knowledge-procedural skills) as two dimensions and suggest that the use of virtual world in education should be based on a clear purpose and adequate planning.

Fig. 14.2: Second Life-Virtual World

Using Virtual Worlds

Here follows some tips for using virtual world environment:

- You can use existing virtual worlds (as an activity) to design teaching-learning around it. So, learners can discover, interact, discuss and prepare reports.

- Create simulation for role-play such as in a business environment.

- Provide virtual experience of space, sea and historical events through existing resources or create your own applications.

- Teach interpersonal communication, team spirit and other soft skills.

- Provide internship opportunities in virtual worlds.

In whatever way you use virtual worlds, you should not forget to provide initial orientation to the learners about the technology, avatars, user interfaces, keyboard shortcuts, etc. (Calongne, 2008). Some time spent on these activities help learners to feel not only comfortable about the technology, but also develops social skills required for learning.
Some examples of virtual worlds are:

- Active Worlds: http://www.activeworlds.com/
- NASA World Wind: http://worldwind.arc.nasa.gov/
- Media Grid: Immersive Education: http://immersiveeducation.org/
- Qwaq Forum: http://www.qwaq.com/

14.4.4 Simulation

Simulation represents a powerful set of tools that can change the way instructional designers create experiences as well as the way instructors facilitate those experiences. Well designed computer-based simulations can make a valuable contribution to student learning. Well planned simulations can provide an environment for conceptualizing and allow learners to internalize major concepts. However, it is important that the physical characteristics of a simulated environment must inspire a learner’s imagination.

Computer simulations can be powerful tools for analyzing, designing and interacting with complex systems or processes. Well-designed computer simulations provide a model of those elements most relevant to the immediate learning objectives. (Lunce, 2004).

Simulations structured by authentic rules that mirror actual results can facilitate learners to model, explore, and try out a variety of strategies. Simulations may include role-playing where they can collaboratively invent, experiment, and practice in a relatively low-risk environment. Experimental simulations provide learners the opportunity to engage in situations that would otherwise be too hazardous or costly to conduct in real situations.

Use of Simulation in Education

Aldrich (2004) identifies the following elements in educational simulation:

- Appropriately used linear, cyclical, and systems content.
- Simulation genres, including branching stories, virtual products/virtual labs, interactive spreadsheets, flight simulator; and 3D maps, as well as new genres to be introduced.
- The appropriate use of genre elements, including modeling, artificial intelligence (AI), graphics, and interface.
- Creating an atmosphere similar to the atmosphere in which the content will be used.
- Presenting behavior to be modeled or recognized.
- Feedback from a decision (or series of decisions) that shows the natural consequences of the behavior.


- Live simulation – real people use simulated (or “dummy”) equipment in the real world;
- Virtual simulation – real people use simulated equipment in a simulated or virtual environment viz.;
Learning Support Systems

Constructive simulation – simulated people use simulated equipment in a simulated environment viz. War gaming.

There are innumerable example of use of simulations in education and training. Some important ones are elaborated here to give a glimpse of their usage in an educational set up:

1) The NASA Glenn Research Centre has developed a series of interactive computer programs for students to foster hands-on, inquiry-based learning in science and math. All of the programmes are Java applet based which run in browser, online, over the World Wide Web. (http://www.grc.nasa.gov/WWW/k-12/freesoftware_page.htm)

2) Real Lives 2010 is a unique, content rich and empathy-building real world, real life simulation that challenges life skills (not your hand-eye coordination) as one has to make difficult, high-stakes choices that may lead to success, or failure. Real Lives 2010 is a role playing kind of simulation which makes the world come alive on a personal and global level. It has exciting features 3D animated graphics of all faces in the simulation, family trees, graphs of personal and country statistics, integrated Google Maps and Flickr photos, and more in a user friendly interface. (http://www.educationalsimulations.com/products.html)

3) PhET provides fun, interactive, research-based simulations of physical phenomena for free. To help students visually comprehend concepts, PhET simulations animate what is invisible to the eye through the use of graphics and intuitive controls such as click-and-drag manipulation, slider and radio buttons. In order to further encourage quantitative exploration, the simulations also offer measurement instruments including rulers, stopwatches, voltmeters and thermometers. As the user manipulates these interactive tools, responses are immediately animated, thus effectively illustrating cause-and-effect relationships as well as multiple linked representations (motion of the objects, graphs, and the underlying science, deepening their understanding and appreciation of the physical world. (http://phet.colorado.edu)

4) Sim Teacher.com is an online simulation platform for teacher education. Pre-service teachers may become “Sim Teachers” in a virtual school, applying concepts they are learning in their college courses to teaching scenarios in a simulated environment. The virtual schools contain fictional yet interactive characters that add life to the scenarios and personalize the scenario-based learning experience for learners. Sim Teachers may perform routine activities, like creating lesson plans, taking attendance or completing an Individualized Educational Plan (IEP). (http://www.simteacher.com).

Check Your Progress

Notes: a) Write your answers in the space provided.
   b) Compare your answers with the one given at the end of the unit.

3) Define virtual laboratory.

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14.5 USE OF INTERACTIVE TOOLS FOR LEARNER SUPPORT

Today, email has become an important mode of communication from one person to another or many others through the use of devices like computer, tablet, mobile and networks.

14.5.1 Electronic Mail

Electronic mail or in short “email” is one of the most popular and useful features of the Internet. By definition, it is mail delivered through electronic means. However, while tracing the development of the email communication, Tao and Reinking (1996) identified at least three definitions of e-mail:

1) It is mail being transmitted electronically.
2) It is the only communication through computers, but would include graphics as well as texts as appropriate email communication.
3) It is the only text being transmitted through computers between senders and receivers.

Some important characteristics of email are as follows:

- It is text-based, and requires literacy skills. Language is the major means by which the e-mail communication is done.
- A mail once typed can be sent to multiple persons/locations without duplicating efforts.
- It is asynchronous in nature, and can overcome problems posed by geographical time zones.
- Messages sent and received as email can be stored and organized in a way that can facilitate easy retrieval.
- It is a cost and time saving technology. It also reduces the use of paper and is environmental friendly.

Educational Use of Email

It is the use of email that makes e-Learning possible. In most e-Learning programme the basic need is to have an email account. Sometimes, a whole course is offered through email as well. So, the use of email is enormous in education. Primarily, email has two main applications in education: research and teaching. Email is used as a research tool, and also as a carrier of research tools (such as questionnaire and interview schedule). However, email is used for
communication and interaction between learner and learners, and learner and teachers. Email provides the advantage of speed, and information and announcements about a schedule/reschedule of classes can reach the learners before they travel to the classroom/study center. Learners with special needs (hearing impaired) can interact with the teachers using email, while visually impaired learners can use email with other text-to-speech readers. In a conventional classroom, a learner may feel intimidated to talk and raise questions/doubts, but can choose to interact through email. Email can be used for delivering of lessons. Teachers can develop email groups to discuss topics related to the curriculum (Dorman, 1998). Kim (2008), through a review of the literature, identified the following advantages of email use that contributes to academic achievement:

- **Enabling immediate, frequent support for individual needs**: learner-centered context; individualized instruction; exchange of resources and information.
- **Fostering psychological comport**: intimacy; expression of personal ideas; opinions, and emotions; informal conversations; social content exchanges; interpersonal contexts.
- **Building interpersonal skills**: collegiality; awareness of others’ attitude; insights into others’ perspectives; close relationships.
- **Developing thoughtfulness**: cognitive task structuring; careful analysis; critical thinking; reflection; planning.
- **Encouraging interest**: enthusiasm; motivation: self-esteem; self-confidence; change in personal values; active participation.
- **Permitting authentic but convenient context**: gap reduction between knowledge and practice; real-world anxiety decrease.

### 14.5.2 Discussion Forum

Computer-mediated communication (CMC) is becoming more commonly utilized in the transaction of curriculum. There are different ways of incorporating CMC: one application, that is being increasingly utilized, is online discussion forum or group. As an application, the discussion group provides a limited and structured online environment for the provision, exchange and/or discussion of information between teacher and learners and/or between learners. A defining feature of the asynchronous discussion forum as an application is that it allows for comments to be posted and viewed at a time of convenience to the student or the teacher. In other words, there is no need to be connected at a specific time.

In order for e-educators and those utilizing a blended learning approach to achieve improved learning outcomes, it is imperative that teaching and learning strategies incorporating online discussion forums are pedagogically sound. As such, the increase in usage of online discussion forums in higher education has led to the associated need to increase our understanding of how to best incorporate such applications into teaching (Stodel, Thompson, & MacDonald, 2006; Tallent-Runnels, Thomas & Lan et al., 2006).

**Educational Uses of Discussion Forums**

Within the e-Learning environment, it is the discussion forum that commonly provides the platform for dialogue between learner and teacher as well as
collaborative activities between learners, without the requirement of a face-to-face encounter (Garrison, 1997; Kear & Heap, 2007). Rudimentary use of discussion forums within the delivery of a subject is as a means to provide information or direction to learners on course content or administrative matters. Used in this way the forum offers the student a right of reply often for confirmation of understanding. And, perhaps more significantly, it presents a lasting record of the information involved in the subject. This can contribute to a sense of a shared learning space and process, involving instructors and students, which can, in turn, lead to more open and productive communication around subject content and procedures.

A more advanced and increasingly used application of the discussion forum within education is as an online environment for subject content discussion, similar to a tutorial. A relatively straightforward approach to this is for the instructor to set a question or topic with learners encouraged or required to respond to the content related topic and have ongoing discussions with their peers on this topic (Johnson, 2006). This conception of the online discussion forum manifests in a question and answer format with the teacher posing the question, students required or invited to provide an answer and the instructor positioned to confirm, refute or provide the “right” or model response. Used in this way, the nature of asynchronous online discussion forums (where messages and postings can be viewed when convenient) and thereby encourages a more in-depth, academic and constructive dialogue (Sandor & Harris, 2008, Garrison, 1997; Johnson 2006). This is the real advantage of asynchronous discussion forums over more fancied synchronous applications such as real-time or synchronous audio, visual or even text only online classrooms or informal and rapid dialogue applications such as blogs, wikis and chat rooms.

With respect to applying the discussion forums as ‘a learner centred, peer e-learning environment’, the following need to be considered:

- **Assess forum participation**: A significant portion of the subject marks accorded to forum participation, increases the student interest in participation. All three components – primer, postings and facilitation should be separately assessed;

- **Participation as a requirement not an option**: Student is required to participate in each weekly forum with marks deducted for any forum missed by the student;

- **Limit the length of time the forum is open (one to two weeks)**: This compresses the dialogue and promotes greater and more coherent interaction among students. If you are running a series of forums across the semester, this strategy will require students to engage with subject material on a weekly basis;

- **Limit participant numbers in a discussion group**: Too few and too many participants in a forum become counter productive. The ideal number for a group is between 10 and 25 participants. Less than 10 participants is not viable to sustain a discussion. The forum becomes too busy with more than 25 participants as they are less confident of their standing in the group.; and

- **Set topics and assign students**: The forums must set topic that is directly linked with the subject being studied – ideally supported with resources such as lecture, topic notes, references, and web links. Students must be assigned topics (primer and facilitation role) early in the semester.
Sharing of resources is currently of much interest and investment throughout the world. The widespread use of online resources in teaching-learning provides new opportunities and benefits to the education system. Technology facilitates sharing and re-use of resources among the institutions and their employees can benefit from the resources. Despite the development of multiple educational resource repositories worldwide, teachers occasionally use repositories to share materials because of some restrictions. Institutional policies on sharing of resources must ensure that employees share the resources as well as benefit from the repository.

In the following sub-section, you will learn about the digital repository of NCERT

### 14.6.1 National Repository of Open Educational Resources (NROER)

The National Repository of Open Educational Resources (NROER) is an initiative of the Ministry of Human Resource Development (MHRD), Government of India and Central Institute of Educational Technology (CIET) of NCERT to bring together all digital and digitisable resources across all stages of school education and teacher education. This covers all subject domains and will be available in all Indian languages. It facilitates use of the digital resources to reach out and connect all members of the school community through a variety of events and interactions (http://nroer.gov.in).

Currently, NROER has more than 21,200 resources of various categories including videos, audios, documents, interactive objects and images. Till 20 July 2016, a total of 10737480 hits, 206,132 unique visitors visited over 4415746 pages on NROER. As on date, it has more than 22,000 registered users. Resources are available in about 29 different languages, including tribal languages (Limboo, Lepcha, Bhutia from Sikkim, Kokborak from Tripura, Santhali and Khortha from Jharkhand, Methei from Manipur, Ao and Tenyidie from Nagaland, Garo and Khasi from Meghalaya, Galo from Arunachal). The repository hosts concepts from classes VI to XII and will soon span across classes I to XII in Environmental Studies, Science, Social Science, Mathematics and Art education. The resources include textbooks, audio, video, photographs, charts, maps and interactive content.
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NROER Platform

This Repository runs on the MetaStudio platform, an initiative of the Knowledge Labs, HomiBhabha Centre for Science Education. As a part of this initiative, all the text books and resource books of NCERT are digitised into ePub 3.0 and flipbook versions and everyone can access these e-books. Features of these books allow users to select, read, zoom, bookmark, highlight, navigate, share and make notes digitally.

(Source: http://www.ncert.nic.in/writeupnroer.pdf)

14.7 TOOLS FOR COLLABORATIONS

The World Wide Web (WWW) is considered as a platform to retrieve information. The information provided through HTML codes and sharing of resources through FTP (File Transfer Protocol) is its main utility. There was a need to add “interactivity” on the web. Therefore, tools were developed to enable users to add content to the web. Such content could be in the form of text, audio, video, slideshows, etc. This at once turned the web to become a common communication superhighway for all users. The term web 2.0 was first used in 1999 by Darcy DiNucci; but it came into prominence in 2004 when O’Reilly Media hosted the first Web 2.0 conference. Web 2.0 emerged as a platform where the users (teachers, students and anyone) could read and write. It has taken the educational delivery to the next level of advancement where content can be generated through online collaboration. It is an innovative platform where the creative minds meet and discuss or share ideas and innovations.

Web 2.0 offers many services like social networking, user collaboration, content sharing, photo sharing, document sharing, video sharing, etc. Some of the key Web 2.0 services that are popular among webusers today are:

- Blogs
Let us discuss about Blogs and Wikis.

14.7.1 Blog

A blog is a personal website where the user posts his/her personal content organized like a journal or a diary. Each entry is dated, and all entries are displayed on the web page in reverse chronological order, so that the most recent entry is posted at the top. Readers catch up with blogs by starting at the top and reading down until they encounter material they have already read.

Blogs are typically thought of as ‘personal journals’. However, there is no limit to what may be covered in a blog. It is common for people to write blogs to describe their work, their hobbies, their pets, social and political issues, or news and current events. And while blogs are typically the work of one individual, there are some blogs that combine contributions of several people. These are called ‘group blogs’.

While the earliest blogs were created by hand, blogging become widely popular with the advent of blog authoring tools. Among the earliest of these were Userland and LiveJournal (www.livejournal.com). Today, most bloggers use either Google’s popular Blogger service (www.blogger.com) or WordPress (www.wordpress.com). These services allow users to create new blogs and blog posts by means of simple online forms; the writer does not need to know any programming or formatting. As a result, blog aggregation services such as Technorati (www.technorati.com) have reported that tens of millions of blogs have been created (Technorati, 2008).

The blogs are connected to each other to form what is commonly known as the ‘blogosphere’. The most common form of connection is form blogs to link to each other. Blog authors may also post a list of blogs they frequently read; this list is known as a ‘blogroll’. Blogs may also be read through special readers, known as ‘RSS readers’, which aggregate blog summaries produced by the blog software. Readers use RSS readers to ‘subscribe’ to a blog. Popular web-based RSS readers include Google Reader and Bloglines.

While blogs once dominated the personal publishing landscape, the new form one part in a much more diverse landscape. Many people, who earlier wrote blogs, are using social networking sites such as MySpace (www.myspace.com) or Facebook (www.facebook.com). Others use ‘microblogging’ services such as Twitter (www.twitter.com). And blogs, which began as text-based services, have branched into audio blogs (also known as ‘podcasts’) and video blogs (‘vlogs’). Authors typically upload a wide range of multimedia content such as ‘art work’ to sites like deviantart (www.deviantart.com), videos to hosting services such as YouTube (www.youtube.com), slide shows and PDFs to SlideShare (www.slideshare.net) and photos to sites Flickr (www.flickr.com).

Using Blogs in Education

Blogs are widely popular in education, as evidenced by the 400 thousand educational blogs hosted by edublogs (www.edublogs.org). Teachers have been
using them to support teaching and learning since 2005 (Downes, 2004). Because blogs are connected, they can foster the development of a learning community. Authors can share opinions with each other and support each other with commentary and answers to questions. Additionally, blogs give learners ownership over their own learning and an authentic voice, allowing them to articulate their needs and inform their own learning. (University, 2007) Blogs have been shown to contribute to ‘identity-formation’ in students (Bortree, 2005).

Further, blogging gives students a genuine and potentially worldwide audience for their work (Aguilar, 2009). Learners also have each other as their potential audience, enabling each of them to take on a leadership role at different times through the course of their learning.

Moreover, blogging helps learners see their work in different subjects as interconnected and helps them organize their own learning. Working with the teachers and informed by blogs authored by experts in the field, learners can conduct a collective enquiry into a particular topic or subject matter creating their own interpretation of the material.

Blogs teach a variety of skills in addition to the particular subject under discussion. Regular blogging fosters the development of writing and research skills. Blogging also supports digital literacy as the student learns to critically assess and evaluate various online resources.

**How to Use Blogging in Learning?**

- Most uses of blogs in the classroom began with the instructor using blogs to post class information such as lists of readings and assignment deadlines (Downes, 2004). This fosters in the teacher a familiarity with the technology and with learners a habit of regularly checking the online resource.
- Before requiring learners to blog, instructors should lead by example, creating their own blogs and adding links to interesting resources and commentary on class topics. This not only produces a useful source of supplemental information for learners, it creates a pattern and sets expectations for when learners begin their own blogging.
- Learners should begin their entry into blogging by reading other blogs. Teachers should use this practice not only to demonstrate how other people use blogs to support learning but also to foster critical thinking and reading skills. Teaching how to respond to blog posts is as important as creating blog posts.
- Blogging should not be a solo activity. Encourage bloggers to read each other’s works and to comment on them. Encouraging learners to set up an RSS reader with each other’s blogs, will make reading and commenting a lot easier. Teachers, also, should subscribe to learner blogs and offer comments, again setting an example of the expected practice.
- A student blog becomes important because it is a manifestation of his or her own work. However, to have this value, a student’s ownership of a blog must be genuine.

**14.7.2 Wiki**

A wiki is a ‘website’ which can be edited by any one having an account on the wiki platform. Wiki is a great tool for collaboration over the Internet and also a
store house of information. Allowing anyone to add, delete or edit the content on the wiki pages has made it an effective tool for collaborative writing.

The term ‘wiki’ has been taken from Hawai’i Language, where they call it a wiki wiki (means quick or fast). In simple terms, a ‘wiki’ can be taken as simplified web pages where all the previous versions of a page are also stored. This enables one to retrieve any past page. There are different tools inbuilt in a wiki system to keep track of changing information on wiki pages or uploading images, audio or video or providing links (URL) to internal pages or external websites (external links).

**History of Wiki**

WikiWikiWeb was the first Wiki software which was developed by Ward Cunningham in 1994. He described it as “the simplest online database that could possibly work.” [http://en.wikipedia.org/wiki/Wiki#cite_note-2#cite_note-2]. The Wikis are popular as collaborative software and are commonly used for project communication, and documentation where one user can comment on and edit the text of another user. Wikis are dynamic databases for creating, sharing, updating, using and searching information on the web. Wikis function as open platforms to engage in sharing and learning.

![Fig. 14.5: Wikipedia home page](image)

**Strengths and Limitations**

Wikis allow learners to contribute actively to knowledge construction, networking and mutual collaborations. A wiki is an ever-growing web of knowledge that any user may append. A wiki may be reused by many class sessions and different groups of learners, with content being added to and modified on a continual basis. Wiki-related learning activities enable collaborations among different learners, instructors, classes, schools, universities, and experts from anywhere across the globe (Bonk & Zhang, 2008). Wiki applications facilitate teaching and learning by providing shared knowledge repositories that are constantly updated and corrected. Learners may not only use existing wikis for information and resources, but also create new wikis or add to existing ones, which further empowers them with a strong sense of ownership in the learning process. Engaged in a wiki project, such as writing a wikibook, learners have opportunities to share knowledge through active, meaningful, and collaborative learning and...
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research. Learners are highly motivated to work and collaborate continuously in wiki-related learning tasks (Watson, Boudreau, York, Greiner, & Wynn, 2008). Wiki-related learning activities may also address the demanding needs of generational learners (Zhang & Bonk, & Zhang, 2008; Zhang & Bonk, 2008). The easy function of incorporating multimedia also enables learners to add various forms of expressions in wikis, addressing multiple intelligences (Zhang & Bonk) without complex technical operations (Choy & Ng, 2007)."

Strengths

• Free, openly available to anyone (you need an internet connection to access pages).

• You can write on the topic of your interest while others can contribute to your content.

• Since others can contribute to your content, it encourages peer review of content and quality of content may improve.

• The wiki pages can be edited only by an authorized or registered user.

• You can create and save all pages and can revert back to a page any time.

• The ‘Watch’ feature keeps you informed of any change of content on that page.

• It provides a collaborative platform for developing and sharing content. Different people can work on the same document.

• You can include online quizzes and assessment activities in your course modules.

• You can integrate other software utilities and applications into wiki pages, like YouTube videos, Slide Share presentations, Google Calendar, MindMap, etc.

• You can learn and use wiki editing skills easily.

• As soon as you edit and save a page, it is published on the web instantaneously.

• There is a wide range of open source software that you can install for institutional wiki. Thus you can save on licensing costs.

Limitations

• There can be incomplete information on a wiki platform.

• Since anyone can edit the pages, there are chances that incorrect information can be uploaded onto the pages. (But since others can read that and correct it, so this aspect can be taken care of). Also at systems level editing can be blocked if required.

• Educational institutions are yet to recognize it as a full scale mode of instructional delivery. There are questions about the validity and reliability of content.

• There is no formal structure of wiki. Therefore, the information can be disorganized if page designing is not done carefully.
Check Your Progress

Notes:  a) Write your answers in the space provided.
       b) Compare your answers with the one given at the end of the unit.

5) How can you make effective use of discussion forum in education?
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6) List three benefits of blogging in teaching and learning.
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14.7.3 Example of School Collaboration

Let us discuss very popular school collaboration project known as ePALS and its functions here.

The School Collaboration Project ‘ePALS’ connects 4.5 million students and teachers in 191 countries for teacher-designed cross-cultural and interactive projects. Classrooms use monitored email, language translation, discussion boards, maps and more to work and learn together. Find a partner classroom and collaborate on school projects, practice foreign language skills and establish international friendships. (www.epals.com).

ePALS provides teachers and students with:

- a searchable online community of over 90,000 classrooms from 191 countries;
- access to the entire site in English, French, German, Spanish, Portuguese, Arabic, and Japanese;
- an instant translation tool integrated into web mail and the discussion forums;
- professionally moderated discussion forums and teacher monitored web-mail accounts;
- secure password protected chat; and
- collaborative projects and activities.

The figure 14.6 shows how we can connect people through ePALS. You can also filter information by language spoken, subject, interest, grade taught and specialization.
Using EPALS

Go to www.epals.com and “join” the community. You will need to write a profile – focused on your students, classroom and school – to be able to contact other people in the global community. A real person will read your profile and suggest how you can improve it. (Profiles are screened to see whether such a school exists and whether the teacher actually works there.) Use your school district email account when you sign up, so it’s easier to show that you are a teacher.

You can also choose to get free SchoolMail for yourself and for your students. This award-winning email system provides features that teachers asked for, and has received the highest standard of Internet privacy and safety. ePals has TRUSTe certification. Look for the logo on sites that work hard to protect students… not all education sites have it!

Once you have gotten a SchoolMail account (for your classroom or school), you can easily upload student names and get names and passwords created. This allows students to have a pen pal in another part of the world. If the pen pals are in other countries, you can use the instant language translation feature to allow your students to understand when students write in another language. Or the students in the other countries might be quite interested in trying out the English they are learning in school with your students.

To help your students learn more about Arctic life, weather, animals, and resources, see whether you can find other students who live in Arctic areas to connect with. You could ask a set of questions that go beyond what can be found in a textbook. You might ask them to share pictures of their school, their homes and what they do after school for fun. What kind of pets do they have? What chores do students do before or after school?

ePals also offers some projects that might be a great way to organize your learning activities. These projects provide great guidance to teachers in collaborating and specifying what is to happen in five or six email exchanges. Two of particular interest in science would be Weather and Global Warming. Students who live in
Arctic areas could describe observed changes in their environment that are happening because of global warming and possibly even share pictures. In addition, a focus area on Biodiversity this fall offers great resources to extend student learning as well as encourage additional discussion on this important topic.

Once your students have gotten used to the idea of learning from and collaborating with distant students, they will want to continue the real-world interaction. You can use many real-time data projects with your students, either joining an existing project or creating your own.

14.8  LET US SUM UP

In this unit, you studied various uses of ICT in support services. The technology used for self learning and how e-content and its components help the learners teaching learning process. You also studied about digital library which is a collection of digital objects that include text, visual material, audio material, video material, stored as electronic formats. We also discussed the use of simulation, virtual labs and virtual world. Interactivity plays very important role in support services. We discussed the importance of email and its uses in education. Also, you have learnt about discussion forum which is an asynchronous tool that encourages dialogue, communication and collaborative learning. While discussing about tools for sharing resources, we highlighted NROER the national repository of open educational resources. At the end of the unit, you learnt how blogs are important tools for teachers and learners. We have discussed the use of wikis, strengths and limitations for teaching and learning. Lastly, we discussed the ePALS project for connections and collaboration.

14.9  SUGGESTED READINGS AND REFERENCES

Support Systems, Legal and Ethical Issues


IGNOU (2000), Unit 15, Instructional Management Related Activities- 11, in ES-335: Teacher and School, New Delhi: IGNOU


14.10 ANSWERS TO CHECK YOUR PROGRESS

1) Learning support system refers to any system which provide academic resources to support student learning in educational institutions

2) Some of the search criteria used are:
- Author
- Title
- Key Words
- Journal name
- Publisher
- Date
- Publication type (books/journals/CD)

3) virtual lab is simply a laboratory experience without the actual lab.

4) Uses of simulation in education are as follows:
- It can be used for modeling system before actual design.
- Teach high risk skill such as aviation and sophisticated medical surgery.
- Create science lab.
5) For effective use of discussion forum in education, the following can be considered:
   - Learner participation in discussion forum to be assessed.
   - Participation should be a requirement to complete a course and not option.
   - Each discussion forum should be available for one or two weeks for interaction.
   - Topic for discussion given in advance.

6) The benefits of blogging in teaching and learning are:
   - Learners can articulate their voice and take ownership.
   - World wide audience to ideas.
   - Learners develop interconnection and collaboration by posting comments.
UNIT 15  ICT FOR INCLUSIVE CLASSROOM

Structure
15.1 Introduction
15.2 Objectives
15.3 Inclusive Classroom
15.4 Role of ICTs in Inclusive Classroom
15.5 Use of ICT in Inclusive Classroom
15.6 Understanding Assistive Technology
15.7 Categories of Assistive Technology
15.8 Using Assistive Technology in Inclusive Classroom
15.9 Let Us Sum Up
15.10 Suggested Readings and References
15.11 Answers to Check Your Progress

15.1 INTRODUCTION

Renu teaches Science in class 8 in Bangalore. She has in her class two children with special needs, Zamir and Koshish, who are hearing impaired. Once while working in her kitchen garden, she could see a pair of earthworms in a pot. Incidentally, she was planning for the next day a lesson on ‘Farmers’ Friend-Earthworm’ and was in a dilemma about how to ensure active involvement of Zamir and Koshish in the lesson. Initially, she thought of carrying the earthworms with her to the class. But she realized that she would be missing these two friends who made her kitchen garden as their home. Just by seeing the earthworms, children cannot understand how earthworms dig the soil to make it good for the plants. By weighing all alternatives, she decided to make a small movie with the help of her mobile phone. Renu finally made a short movie and presented the same over an LCD projector along with her lesson. To her surprise, it was not only Zamir and Koshish benefitted, the whole class was benefitted by the movie. Just think how Renu used ‘multimedia’ to make her lesson inclusive. She thought it was a small effort; but it was a great work.

For inclusive classroom, you need to use assistive technology. This technology helps individuals with disabilities function more like those without disabilities by helping to bridge the gap between what people can do and what they may need to do. In this Unit, we shall discuss the role of ICT in an inclusive classroom and how various ICTs can be used in teaching learning processes. Besides ICT, we shall address the need of Assistive Technology (AT) in the classroom.

15.2 OBJECTIVES

After going through this Unit, you will be able to:

• explain the concept of inclusive classroom;
• appreciate the role of ICTs in promoting inclusion in classroom;
• discuss the appropriate use of ICTs as per the diverse needs of students;
15.3 INCLUSIVE CLASSROOM

You have already read the Course BES 128, in which we have discussed on how to create an inclusive school and deal with special needs of children. International policy and legislation on the rights of persons with disabilities is strongly in support of children with disabilities receiving their education in an inclusive, rather than segregated, school setting. Children with diverse needs including disabilities are the valued members of the school community. Teachers can facilitate a positive environment in the school that respects inclusiveness and provides equal opportunities to the children with special abilities, from varied social backgrounds and diverse learning needs. Hence, inclusive classroom promotes learning of all children, with special abilities, with various social background and with diverse learning needs. The present system advocates that where possible, children with disabilities are accommodated in inclusive schools. This promotes cost-effectiveness and leads to a more inclusive society. ICT is one of many supports that can enable the realization and implementation of inclusive education. ICT has a major role to play in enabling educational authorities, teachers, students and parents to move towards a more inclusive educational system.

15.4 ROLE OF ICTs IN INCLUSIVE CLASSROOM

When we consider using ICTs for students with special needs, then it is very important to ensure that the technology can be used by them. That means- it has to be accessible. Accessible ICTs are the wide range of assistive and mainstream technologies and formats that can enable students with a disability to enjoy an inclusive education. Accessible ICTs also include assistive technology (AT) which can be defined as a “piece of equipment, product system, hardware, software or any service that is used to increase, maintain or improve functional capabilities of individuals with disabilities.” A person’s ability to use technology may be impaired due to various physical, sensory, emotional or cognitive disabilities. One common feature of accessibility is the small tactile node, or ‘dot’, found on the ‘5’ key on most keypads for computers and telephones. By finding the ‘5’ key by touch, anyone can locate the other numeric keys without looking at it. Accessible ICTs hold the potential to enable students with disabilities to receive education and become independent in social and economic life of their communities. Moreover, they provide equitable learning opportunities through enabling communication with teachers and fellow students. They also provide access to learning materials, so that students are able to do the course work, assignments and appear for examinations. In general, accessible ICTs:

- enable greater learner autonomy;
- unleash hidden potential for those with communication difficulties;
- enable students to demonstrate achievement in ways which might not be possible with traditional methods; and
- enable tasks to be tailored to suit individual skills and abilities.
The wide variety of accessible ICTs are currently available and can help to overcome reduced functional capacity. Accessible ICTs, therefore, include:

- **Mainstream technologies** - such as computers that contain in-built accessibility features;

- **Accessible formats** - also known as alternate formats - such as accessible HTML (HyperText Markup Language), DAISY (Digital Accessible Information System) books but also include ‘low-tech’ formats such as Braille.

- **Assistive technologies (AT)** - such as hearing aids, screen readers, adaptive keyboards etc. AT is a “piece of equipment, product, system, hardware, software or a service that is used to increase, maintain or improve functional capabilities of individuals with disabilities.

In its training guide “ICTs in Education for People with Special Needs”, UNESCOs Institute for IT in Education outlines 3 mains roles for the use of accessible ICTs in education:

- **Compensation uses** – technical assistance that enables the active participation in traditional educational activities such as reading or writing;

- **Didactic uses** – the general process of using ICTs to transform approaches to education. Many ICTs can be used as a didactical tool to enable a more inclusive learning environment;

- **Communication uses** – technologies that enable communication – often referred to as alternative and augmentative communication devices and strategies.

A meta-study carried out by the British Educational Communications and Technology Agency (BECTA, 2003) on the use of accessible ICTs showed the following benefits to all stakeholders involved in education, including students, teachers and parents.

**Specific benefits for students:**

- Computers can improve students’ independent access to education
- Students with special educational needs are able to accomplish tasks working at their own pace.
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- Visually impaired students, using the Internet, can access information alongside their sighted peers.
- Students with profound and multiple learning difficulties can communicate more easily.
- Students using voice communication aids gain confidence and social credibility at school and in their communities.
- Increased ICT confidence amongst students motivates them to use the Internet at home for schoolwork and leisure interests.

Benefits for teachers and non-teaching staff:
- Reduces isolation of teachers working for children with special educational needs by enabling them to communicate electronically with colleagues.
- Supports reflection on professional practice via online communication.
- Improves skills for staff and a greater understanding of assistive technology used by students.
- Enhances professional development and effectiveness of the use of ICT with students through collaboration with peers.
- Materials already in electronic form (for example, from the Internet) are more easily adapted into accessible resources such as large print or Braille.

Benefits for parents:
- Use of voice communication aids encourages parents to have higher expectations of children’s sociability and potential level of participation.

15.5 USE OF ICT IN INCLUSIVE CLASSROOM

ICTs offer a great potential to support lifelong learning for all groups of students, including those who have special needs. The application of ICTs enhances independence, integration, and equal opportunities for such people and in this way they facilitate their inclusion in society as valued, respected, and contributing members. Inclusive classroom or school is a very important component of inclusive society.

Why should you use ICT in inclusive classroom? Let us reflect on some examples:

<table>
<thead>
<tr>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example 1</strong>: Those with hearing impairment cannot access explanations, instructions and feedback which are provided through the voice. Correspondingly, due to the exclusive use of audio format, they cannot receive feedback on their actions/performances.</td>
</tr>
<tr>
<td><strong>Example 2</strong>: Those with low vision may also encounter problems if some facilities such as larger fonts/icons and high contrast between foreground and background are not provided by the application. If such features are not built in the program, then that particular ICT is of no use to such students.</td>
</tr>
<tr>
<td><strong>Example 3</strong>: Those with motor or visual impairments cannot access the program by using the keyboard. If any other alternative input devices are not provided, then their access is restricted and becomes of no use.</td>
</tr>
</tbody>
</table>
ICT, in principle, could be useful to all students but actually it is not entirely accessible for a wide number of those with specific disabilities. In addition, it lacks full compatibility with the available Assistive Technologies. Hence, it leaves most of the encountered problems as unsolved. The use of such educational products (which are not fully accessible) in the classrooms prevents students with special needs from using the same materials as their schoolmates. It also limits their educational opportunities and finally contributes to their ‘exclusion’.

The choice of suitable educational software and appropriate assistive technologies appears to be vital to avoid discriminations among the roles of students and the teachers. While making this choice, you should, bear in mind that educational resource must meet the needs of all students with no exclusion. Several software, gadgets and web based tools are now available which make teaching learning process easier in inclusive classroom. Some of them are listed in the following Box-1.

### Box-1: ICT for Inclusive Classroom: Some Examples

| • podcasting | • wikis | • games and gaming |
| • digital animation | • online reading schemes | • mobile phones |
| • iPods and iPads | • satnav | • art packages |
| • dance mat technology | • story boarding | • using sound |
| • digital storytelling | | • visualisers |

Technology also addresses the necessity to cover a wide range of content in a short amount of time by minimizing the need to take curriculum at a slower pace. Students with special needs may benefit from technologies that assist them as well as allow them to keep pace with their peers. For example, a student with dyslexia who might normally struggle with a reading passage, could benefit from reading the text while listening to an audio recording through headphones. By providing audio, visual, or concept-mapping supports while introducing new concepts, teachers reduce the need for review and remediation after the initial instruction. There are several technologies that can be used in inclusive classroom. Some are discussed here:

**Digital textbooks, eBooks, and Audio-books**

Digital textbooks (both online and CD-based) offer options for accessing the same content at different levels of complexity. The digital format offers an advantage over traditional textbooks because digital publications can incorporate time-based and interactive media directly within the text. CD-based digital textbooks provided by textbook publishers, offer a variety of features, including pronunciation guides, text-to-speech, and vocabulary support, as well as features that allow the reader to change the formatting of the text to improve readability. Many digital textbooks allow students to hear the text. This feature supports students with learning disabilities who benefit from the ability to hear and view the text simultaneously.

**CAST UDL Book Builder**

Some learning situations may require further customization not possible via pre-fabricated content. In these situations, the teacher must seek tools for enhancing text as opposed to already enhanced text. One of the tools is the CAST UDL Book Builder (http://bookbuilder.cast.org/), a free digital book database and book...
builder. Developed and hosted by the Center for Applied Special Technology (CAST), Book Builder helps educators “create, share, publish, and read digital books that support diverse learners according to their individual needs, interests, and skills.” The database and the tool integrate a number of technologies like ‘screen-reading software’ to make content accessible to students with learning disabilities, yet at the same time ‘integrating functionality’, it engages the reader through the use of built-in avatars who pose questions and offer ideas as the students read.

Digital posters

Digital poster displays, like those created using Glogster EDU (http://edu.glogster.com/) and incorporate media elements like images, videos, audio recordings, and drawings with text. Students, who are gifted or thrive on creative freedom, find engagement and challenge in such a format; whereas students with learning disabilities find support in the options for expression. For a thorough discussion of using digital posters in the classroom, see the article “Digital Posters: Creating with an Online Canvas (http://www.learnnc.org/lp/pages/6542).”

VoiceThread

VoiceThread (http://voicethread.com/) is an online platform where students can respond to a topic using text, audio, video, or images. The variety of options makes it possible for students with learning disabilities to contribute to the presentation using the method that works best for them. The option to record an oral response, rather than delivering it ‘live’ in class, benefits students who need time to compose their thoughts, as well as students who have speech disorders like stuttering. In an example of a picture book of poetry for class III, students have commented with both text and audio(https://voicethread.com/myvoice/thread/119840). You may refer to the article ‘Using VoiceThread to Communicate and Collaborate’ for a thorough explanation on how to use ‘VoiceThread’ with students (visit: http://www.learnnc.org/lp/pages/6538).

Digital storytelling

Digital storytelling projects, in which students tell fictional or true stories, are another example of differentiating product by student interest: Each learner draws on his or her background or interest to provide the content for the product. Digital stories can be created in a range of formats, including pure audio, image slideshows with static text, image slideshows with voiceovers, and pure video. The options that prioritize audio over text benefit students who have difficulty with writing. (The University of Houston offers a useful introduction to using digital storytelling in the classroom, visit: http://digitalstorytelling.coe.uh.edu/)

Support for Evaluation: Rubistar

In order to succeed on any class project, all students need the support in terms of clear guidelines. But students with special needs may need additional support to stay on task and complete each step in completing a project. Creating separate rubrics for students who have different skill sets, can provide the appropriate level of support for such students. For example, an oral presentation rubric might include a criterion like, “Share multiple drafts with teacher,” to remind students with organizational/procedural issues of importance of viewing the final presentation as a series of tasks. Web-based tools like Rubistar (http://rubistar.4teachers.org/index.php), a free rubric generator, can help teachers easily create a master rubric and then adapt it for students with special needs.
Check Your Progress

Notes:  
 a) Write your answers in the space provided.  
 b) Compare your answers with the one given at the end of the unit.

2) Select any topic of your choice for an inclusive classroom and find out what technology would be most suitable? And Why?

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15.6 UNDERSTANDING ASSISTIVE TECHNOLOGY

On a daily basis, most of us independently engage in a wide range of important and fulfilling activities. Most of the time we accomplish these activities with ease without thinking about the steps involved in accomplishing them. For an individual with a disability, these activities can be difficult, time consuming, and sometimes even not possible without personal assistance or ‘assistive technology’. In such cases, assistive technology has a great role to play. What do you understand by ‘assistive technology’? Read carefully the following four statements:

• a student with a disability,  
• who wants to perform an activity,  
• using a technology or device,  
• within a context or an environment.

A technology or device with these four components is called ‘assistive technology (AT)’.

Figure 15.1: Areas of Assistive Technology Solution

Source: http://www.augsburg.edu/class/groves/assistive-technology/everyone/
Many students with disabilities require ‘assistive technology’ to participate in and benefit from their educational programs. A range of assistive technology solutions is available to support student performance, achievement, and independence in the following areas:

- academics and learning aids,
- aids to daily living,
- assistive listening and environmental aids for the hearing impaired and deaf,
- augmentative communication,
- computer access,
- leisure and recreation,
- seating,
- positioning,
- mobility, and
- vision.

### 15.7 CATEGORIES OF ASSISTIVE TECHNOLOGY

Students who have access to appropriate assistive technology solutions, that they need, are more likely to be successful in their educational programs. Common assistive technologies which may be required in your inclusive classroom are listed here.

**Academic Learning Aids:** Many students with disabilities use assistive technology to enhance their participation and achievement in their educational programs. There are a range of assistive technology solutions to address student needs in all academic areas including reading, writing and spelling, math, and study and organization.

![Figure 15.2: Academic Learning Aids](https://www.teachingvisuallyimpaired.com/overview-of-assistive-technology.html)

**Aids to Daily Living:** An array of low technology to high technology aids are available for students who have difficulty in completing activities of daily living.
independently. Daily living aids include aids for tooth brushing, eating, drinking, dressing, toileting, and home maintenance. These are typically used by students with physical disabilities.

**Fig. 15. 3: Aids to Daily Living**


**Assistive Listening Devices and Environmental Aids:** Students who are hard of hearing or deaf, often need assistive technology to access information that is typically presented verbally and accessed through the auditory modality. A variety of technology aids or devices that are available today amplify speech and other auditory signals or that provide an alternative to the auditory modality are available today. These include assistive listening devices that amplify sound and speech both in the classroom and home environment, text telephone (TT), closed captioning devices, real time captioning, and environmental aids that support independent living skills.

**Fig. 15. 4: Assistive Listening Devices**

Source: https://arizonahearing.com/find-hearing-aids/hearing-aid-accessories/
Augmentative Communication: Students with severe expressive communication impairments have difficulty communicating with peers and adults within their environments. Many of these students need a means of supplementing their communication skills. What these students should actually use are augmentative communication technology devices ranging from low technology to high technology. Today, these are available and include: object-based communication displays, picture communication boards and books, talking switches, voice output communication devices and computer-based communication devices.

Source: http://nmcleod51732013.blogspot.in/2013/02/tango-augmentative-and-alternative.html

Computer Access and Instruction: A variety of technology solutions are available to adapt the classroom computer for students with disabilities. Some computer access technologies offer a method of input other than the standard computer keyboard and mouse. Other computer adaptations include software and hardware that modify the visual and sound output from the computer. There are a variety of such devices. Some of them are adaptive pointing devices, keyboard adaptations, alternative keyboards, touchscreens, onscreen keyboards, mouse alternatives, voice input devices, and environmental aids.

Environmental Control: There are high technology environmental aids that assist students with physical disabilities in controlling electronic appliances within the school and home. These devices allow the student to use an alternate input device such as a switch to control one or more electronic appliances such as lights, televisions, and electronically controlled doors.

![Environmental Control](http://possum.co.uk/product-category/assistive-technology/)

Mobility Aids: Students with physical disabilities often need access to mobility aids to provide them with a means of moving about their environments. Mobility aids include: canes, crutches, walkers, scooters, and wheelchairs. Generally, assistive technology devices such as the mobility aids referenced above are recommended by physical and occupational therapists and are based on the student’s individual needs.

![Mobility Aids](https://www.elder-care-india.com/mobility-aids-for-the-elderly.html)

Pre-Vocational and Vocational Aids: Students with physical and cognitive disabilities and enrolled in educational programs that address pre-vocational and vocational skills, may benefit from the use of prevocational and vocational aids. These types of technology solutions include modifications of the tools and manipulative used in the completion of work related tasks. Low technology solutions include ‘grips’ for handling materials and ‘stabilization devices’ for
supporting work materials. For students using electronic appliances such as staplers and paper shredders, an environmental control unit such as the model available from AbleNet can be used to allow for switch control of the appliance. Many of the adaptations required for participation in work activities may be teacher constructed. For example, a picture-based task schedule can be created to represent all of the steps in a particular activity for students with intellectual disabilities.

Fig. 15. 9: Pre Vocational and Vocational Aids


Recreation and Leisure: Students with physical, sensory, and intellectual disabilities require assistive technology in order to participate more fully in appropriate recreation and leisure activities. A range of low technology to high technology solutions are available for them and include game adaptations, book adaptations, switch adapted toys, and environmental control access for televisions, videos, tape players, CD players and MP3 players.

Fig. 15. 10: Recreation and Leisure Aids

Source: http://www.maddak.com/leisurerecreation-aids-c-1711.html
Seating and Positioning: Students with physical disabilities often require adaptive seating and positioning systems as an alternative to the standard classroom seating systems. Adaptive seating and positioning systems include seat inserts for wheelchairs, side liers, prone standers, and adaptive chairs. These seating and positioning systems are generally determined by the physical and occupational therapist in consultation with the classroom staff. Several different seating and positioning devices for the classroom are available in national and international market these days.

![Seating and Positioning Aids](https://www.especialneeds.com/shop/special-needs-seating-positioning.html)

**Visual Aids**: Students with visual impairments can benefit from ‘assistive technology’ in a variety of areas. A critical need for ‘assistive technology’ is often in the area of accessing printed information and to providing a means of producing written communication. There are many visual aids including talking dictionaries, adapted tape player/recorders, large print and talking calculators, Braille writers, closed circuit televisions (CCTV), and software such as screen reading and text enlargement programs.

![Visual Aids](http://www.freedomscientific.com/Products/LowVision)

15.8 USING ASSISTIVE TECHNOLOGY IN INCLUSIVE CLASSROOM

Assistive technology has the capacity for increasing student independence, increasing participation in classroom activities and simultaneously facilitating
academic improvement of students with special needs, providing them the ability to have equal access to their school environment. Assistive technology is often discussed by technology levels as being high, middle, or low-tech. A low-tech assistive technology option is usually easy to use, has low cost and typically does not require a power source. Mid-tech assistive devices are also easy to operate but typically require a power source. The high-tech device is usually complex and programmable, and usually includes items that require computers, electronics or microchips to perform a function. An example of the application of technology could range from having a voice input word processor (high-tech) to a student using an adapted pencil grip (low-tech) to assist during writing. Another view of assistive technology focuses on the levels in applying the assistive technology personally, developmentally, or instructionally necessary. Of these three, the most important to a teacher is instructionally necessary level. The personally necessary level is concerned with assistive technology devices that are for the use of an individual student, and the suggestion and evaluation of such devices are left to experts. Developmentally necessary assistive devices can be shared among individuals. These devices help meet an educational need based on a developmental delay, which ideally would be improved, thereby eliminating the need for the item in an individual’s future. The instructionally necessary devices are the devices that assist in the instructional process at a course or grade level, and this level has important implications for the classroom teacher. This modification or technology applications would not need to accompany the student as he/she progresses to the next course or academic level, and instead the assistive technology device could remain at the teacher level.

Check Your Progress

Notes:  
a) Write your answers in the space provided.  
b) Compare your answers with the one given at the end of the unit.

3) Based on level of technology, how would you classify AT?

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4) Differentiate between personally and instructionally necessary AT?

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15.9 LET US SUM UP

In this Unit, we have discussed the role of ICT in an inclusive classroom and how various ICTs can be used in teaching learning. In general, accessible ICTs (a) enable greater learner autonomy, (b) unleash hidden potential for those with communication difficulties, (c) enable students to demonstrate achievement in ways which might not be possible with traditional methods, (d) enable tasks to be tailored to suit individual skills and abilities. Technology also addresses the necessity to cover a wide range of content in a short amount of time by minimizing the need to take curriculum at a slower pace. Students with special needs may benefit from technologies that assist them as well as allow them to keep pace with their peers. There are several technologies which can be used in inclusive classrooms.

Many students with disabilities require ‘assistive technology’ to participate in and benefit from educational programs. A range of technology solutions are available to support student performance, achievement, and independence in the following areas: academics and learning aids, aids to daily living, assistive listening and environmental aids for the hearing impaired and deaf, augmentative communication, computer access, leisure and recreation, seating, positioning, mobility, and vision. Assistive technologies are more personal to special children and help to bridge the gap between normal and special children.

15.10 SUGGESTED READINGS AND REFERENCES

ABLEDATA: AbleData - Your source for assistive technology information from http://www.abledata.com/


**15.11 ANSWERS TO CHECK YOUR PROGRESS**

1) A person’s ability to use technology may be impaired due to various physical, sensory, emotional or cognitive disabilities. Accessible ICTs are the wide range of assistive and mainstream technologies and formats that can enable students with a disability to enjoy an inclusive education.

2) Do on your own.

3) Low Tech, Mid Tech and High Tech

4) The personally necessary level is concerned with assistive technology devices that are for the use of an individual student, and the suggestion and evaluation of such devices are left to experts; whereas the instructionally necessary devices are the devices that assist in the instructional process at a course or grade level, and this level has important implications for the classroom teacher.
UNIT 16  ICT: SOCIAL, LEGAL AND ETHICAL ISSUES

Structure

16.0  Introduction
16.1  Objectives
16.2  ICT and Social Issues
    16.2.1  Cyber Space and Social Issues
    16.2.2  ICT Phobia as a Social Problem
16.3  Fair Use of Learning Resources
    16.3.1  ICT Policy
    16.3.2  Internet Filtering
    16.3.3  Managing Intellectual Property
    16.3.4  Copyright in the Digital World
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    16.3.7  Privacy Policy
16.4  Technology Resources for Affirming Diversity
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    16.6.3  Addiction, Anxiety and Stress Creation Using Technologies
16.7  Let Us Sum Up
16.8  Suggested Readings and References
16.9  Answers to Check Your Progress

16.0  INTRODUCTION

In the previous units, you may have learnt about the use of ICT in various contexts such as classroom teaching, learning, interaction among teachers and students, online assessment, learning support services, etc. In this unit, you will learn about the social, legal and ethical issues pertaining to ICT. ICT facilitates use of information available on the Internet. But one should be cautious about the legal aspects such as copyright and intellectual property right. Apart from the use of ICT in education, social media technologies have embedded in our daily life. Technologies like, multiple televisions, laptops, Mp3 players, mobile phones, tablets, game consoles have become part of life of young people nowadays. Social media have created new projections for social interaction and access to information. Due to the rapid growth of Internet, social media and Apps, one should be very careful of the cyberbullying, Internet addiction and other technologies causing anxiety, stress and deviant behavior, etc. You will learn about all these aspects in this Unit.
16.1 OBJECTIVES

After going through this Unit, you will be able to:

- describe ICT and social issues in today’s life;
- explain the ethical issues on use of learning resources available in the online environment;
- discuss the plagiarism and copyright rules and regulations in the digital world;
- discuss the open source, open content and its licensing; and
- discuss the impact of technologies on social culture, problems of cyber bullying and Internet addiction

16.2 ICT AND SOCIAL ISSUES

Access to the ICT has become common in our social life. Mobile services are considered as essential for the society. Internet is an important resource for information about career, education, entertainment, etc. ICT has deeply impacted social life. ICT also plays a key role in the education sector for teaching and learning. With the faster growth of technology, different types of communication modes have emerged such as interactive communications like email, Facebook, twitter, etc. However, the ‘digital divide’ remains and has grown to unethical limits.

16.2.1 Cyberspace and Social Issues

People in a community live together and interact with each other in a common space. Cyberspace may be treated as a conduit touching portion of real space at key points. Here, ideas are passed through the conduit, and business is transacted through this conduit i.e. cyberspace.

Cyberspace communities are members of the global community interacting in a different space than in real space. These members rarely interact in the real space, but they communicate through multimedia means in cyberspace through text, image, sound, or a combination of the three. It is not possible to use the Internet without being a part of this community of people. In fact, one cannot avoid being a part of this community. All the time one uses the Internet as a conduit- by e-mailing people, reading web pages, reading newsgroups, or doing commerce online. This means that one has joined the cyberspace community.

The use of the Internet for both casual and secure applications has soared, with double-digit growth rates measured month-to-month rather than year-to-year. While sophisticated Internet users recognise the need for a digital identity mechanism, many people using Internet applications remain confused to existing levels of security and identification.

16.2.2 ICT Phobia as a Social Problem

ICT phobia is a type of fear in use of any technology or complicated devices, particularly computers, tablets, mobile, etc. Although there are many explanations of ICT phobia, they become more difficult as technologies are growing rapidly.
ICT phobia is often used in the sense of an unreasonable anxiety. ICT phobia is related with the anxiety about learning with computers or not being able to learn effectively using computers. This is basically to avoid fear of learning new skills mandatory for use of computers in the school or workplace. ICT phobia has affected many people around the world. Many teachers refuse to use technological aids for teaching their students just because of fear of technology.

As the use of technology has increased in day-to-day life, one need to use the new technology. As you know that our grandparents nowadays are using mobile phones for interaction with family members and friends. Writing letters to relatives has also reduced similarly. Official communications are sent through e-mails. If people are not ready to accept the change or be afraid of using new technologies, they become isolated in the work place and even in the society.

Skill development is the best way to overcome the fear of technology. Persons suffering from this phobia must be willing to share their difficulties to overcome their phobia. They can get training to acquire skills of using new technologies and improve their self-confidence. Young people must provide support to older people to shun this phobia.

Check Your Progress
Notes:  a) Write your answers in the space provided.
     b) Compare your answers with the one given at the end of the unit.
1) What is cyberspace?

2) List two steps to overcome from the ICT phobia

16.3 FAIR USE OF LEARNING RESOURCES

When you type any word or phrase on a search, you find thousands of related meaning or information. Today’s world is full of information on your click. Whether you get right information or wrong information but you find lots of information available on the Internet. Similarly, learning resources are also available on the Internet. Many online courses are offered free of cost. MOOC (Massive Open Online Courses) are offered by many renowned educators/teachers
Support Systems, Legal and Ethical Issues

across the world. Some learning resources are freely accessible and some have copyright. In the following sections, we will discuss about ICT policy and how learning resources available through ICT can be used in a fair manner with the knowledge of copyright, plagiarism, private policy, etc..

16.3.1 ICT Policy

ICT policy provides strategies to ICT implementation in any sector. ICT policies are accepted and implemented by various government sectors involving issues in ICT. The main thrusts of ICT policy are tele-communication, broadcasting and the Internet. It stipulates guidelines for the use of ICT in the socio-economic activities. The policy consists of a plan of action in the form of guidelines for the users. A National ICT Policy is a policy created and implemented by government for the stakeholders who are dedicated to bring digital technology to all sectors and society so that they can benefit to access the information. ICT policy facilitates use of ICT in different sectors and encourage digitalization. It also regulates the information technology and telecommunications, networking, Internet and information security. The policy covers issues in e-Governance too.

National Policy on ICT in School Education

The National Policy on Education 1986, as modified in 1992, stressed the need to use educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) paving the way for a more comprehensive centrally sponsored scheme – Information and Communication Technology @ Schools in 2004. The significant role ICT can play in school education has also been highlighted in the National Curriculum Framework 2005 (NCF) 2005. Use of ICT for quality improvement also figures in Government of India’s flagship programme on education, Sarva Shiksha Abhiyan (SSA). Again, ICT has figured comprehensively in the norm of schooling recommended by the Central Advisory Board of Education (CABE), in its report on Universalisation of Secondary Education, in 2005. With the convergence of technologies, it has become imperative to take a comprehensive look at all possible information and communication technologies for improving school education in the country. The comprehensive choice of ICT for holistic development of education can be built only on a sound policy. The initiative of ICT Policy in School Education is inspired by the tremendous potential of ICT for enhancing outreach and improving quality of education. This policy endeavours to provide guidelines to assist the States in optimizing the use of ICT in school education within a national policy framework. In 2012 the policy on ICT in School Education was developed. The following areas are covered in the policy.

- ICT in School Education covers challenges and issues, ICT literacy and competency enhancement, ICT enabled teaching learning processes, elective courses at higher secondary level, ICT for skill development (vocational and job oriented areas of general education), ICT for children with special needs, and ICT for open and distance learning.

- ICT for school management talks about automated and ICT managed school processes and school management information system.

- ICT infrastructure includes hardware, network and connectivity, software and enabling infrastructure.
Digital Resources cover digital content and resources, development of content, sharing and dissemination of digital content and role of school library.

Capacity Building talks about capacity building of in-service teachers, capacity building through pre-service teacher education, capacity building of school heads and capacity building of state / district education department personnel.

Implementing and Managing the Policy covers programme monitoring and evaluation group, inter-ministerial group, national and state level agencies, role of the states, programme of action, advisory group, norms, standards and procedures, models for ICT infrastructure, regulatory measures and incentives.

Financing and Sustainability talks about financial aspects and sustainability.

Monitoring and Evaluation covers monitoring, evaluation, sharing of results and findings and policy review.

For details about various areas covered in the policy, you may visit www.mhrd.gov.in.


**16.3.2 Internet Filtering**

The internet filtering instrument uses numerous classification of technologies for collection of URLs. These consist of review by people, a licensed URL filtering engine, internally developed artificial intelligence analysis coding, and automated recognition of content tags. Internet filter is a software tool that allows parents, teachers and administrators to control the list of permitted and blocked websites. Originally, Internet filters were used at homes, at public schools and libraries. Eventually, the Internet filters were incorporated into businesses and private sectors to control Internet use in the workplace. Internet filters prevent employees from wasting work time and protecting the Internet from the malicious content. In certain countries, these are used to prevent citizens from accessing specific websites. There are various kinds of filtering techniques:

- **Host-based filtering:** Through this technique, the administrator installs software on the system. Its rules are made according to the needs of the administrator. Activities attempted outside these rules are prohibited.

- **Server-side filtering:** Companies and organizations normally adopt this at the gateway level. The company can install hardware or software that is capable of filtering traffic at the gateway level and rules would be configured that would apply to all users inside the company network.

- **Content filtering at the Internet Service Provider (ISP) level:** Many Internet service providers are providing this service at an additional cost. Companies and organizations which do not wish to invest in their own gateway-level content filtering device, can opt for this option and notify the ISP of their content filtering conditions. This method is not as effective as the other three options because users can bypass the filtering by changing the browser settings.
Some well-known Internet filters are (i) Norton Online Family, (ii) Net Nanny, (iii) Cyber Patrol, (iv) Parental Internet Filter (Source: http://www.apu.edu/imt/policiesandprocedures/filtering/).

### Check Your Progress

**Notes:**

a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

3) Fill in the blank.

i) ICT policy on school education was developed in the year ......

4) What is Internet filtering? Describe various kinds of internet filtering techniques.

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### 16.3.3 Managing Intellectual Property

Intellectual property has emerged as a major issue in education, especially due to the use of digital media and resources in the delivery of education. While intellectual property covers a broad range of concepts such as patents, copyrights, trademarks and designs, in this section we will focus only on copyrights. The copyright laws differ from country to country, though there is a general convention on it to which most countries are signatory. Thus, we will make general statements on copyright related issues, and would suggest you to consult your legal advisor, when in doubt. There are certain aspects of a copyright law that are subject to interpretations and sufficient cases are not available to make generalizations. Many a times, copyright laws are subject to interpretations and sufficient cases are not available to make generalization. Many a times, it takes time to get judicial verdict for copyright violation as legal case can linger from lower courts to upper courts and up to the supreme court of a country, and thus it involves wastage of time and resources. Protection of copyright is an important concern for educational institutions as they need to protect the intellectual property created by their faculty, and provide appropriate rewards to the creators of work. While we are not going to discuss how to safeguard intellectual property, we are more interested in how not to violate the laws and avoid legal battles. Educational institutions develop huge amount of learning materials. Therefore, it is important that copyright policies are in place to safeguard institutional interests.
What is Copyright?

Copyright is the exclusive rights given to the creator of the original work to reproduce, translate, adapt, copy, perform, authorize, receive royalty on the work and engage in any other economic benefits arising out of the work. The Copyrights Act 1957 (in India) protects the creator of the original work by making it illegal for others to use the original material without the creator’s or owner’s consent. Many teaching institutions appoint Copyright Officer to handle issues related to copyright, asking for permissions, payments to copyright holders and keeping records of copyright permissions granted by the institutions. Some other institutions advice the authors to get the copyright permission if third party materials are used beyond “fair dealing” clause. The fair use clause in copyright laws allows for a small proportion of work to be used without the need to seek permission from the copyright holder. However, the amount of “small” is open to interpretation. Moreover, it is also possible to use some works (one time only) in the classroom contexts, and that would not be violation of copyrights. But, in education contexts, the issue of fair use becomes complex. As the materials are printed, many institutions do earn profits out of the works.

16.3.4 Copyright in the Digital World

The issue of copyright becomes more complex in the digital world. Many access websites without password protection and make use of the web materials in their work. In fact, a website is like a book. So, the copyright laws are also applicable to the websites. Unless the author/creator of the website gives open permission to use the contents, we can’t make use of the same in our work. However, fair use of the contents in the website for the purpose of research and criticism are always permitted. Some also think that the websites are in public domain. In fact, they are not. Any material under ‘Public Domain’ means that it is not covered by copyright laws or the intellectual rights. For example, in many countries, the expiry of copyright is considered from 50-70 years after the death of the creator. In United States, the Government works are not covered under copyrights and are available in public domain.

Who owns online courses and digital materials? This question is often asked by many, especially in the context of online learning. The materials created under hire (job) are normally owned by the employer. So, the learning materials created by a teacher under employment are the copyrights of the employer. However, this is governed by the contract of the teacher in many universities. Some even permit the teachers to take the course with them when they leave the university. So, institutions must have clarity on copyrights of the work created by them, especially those created by the staff and those created by outside consultants. Whatever may be the situation, while creating copyrighted work, it is important to use works of others as per accepted conventions, and permissions are taken from the copyright holder for tables, graphics and when a significant portion of text is used.

Bates (2000) provides the following advice on copyright for creators of digital materials:

- Use the same rules of print publication to digital materials, wherever possible.
- When in doubt, ask for permission. Usually permission is granted by the creator for non-profit use.
• Always password protect your course sites, and also inform the users that the materials in the site are for their personal use, and not for sharing with others.

• Provide link to other sites, rather than copy material and host in your server.

• While using links to other sites, check the copyright provisions in the site. If advised, inform the webmasters. Sometimes, due to heavy traffic on a site it may crash (if appropriate bandwidth is not available), and thus it is normally your responsibility to inform the sites, if you are directing large number of users to them.

• Clearly give copyright statement in your sites.

• Always acknowledge the use of other materials, especially indicate the permission taken. Don’t give permission to use third party materials in your site. Refer the requesting person to the appropriate copyright holder.

• Educate all stakeholders about copyright and implications.

• Develop appropriate legal instruments, contracts, agreements following the copyright laws.

16.3.5 Plagiarism

Plagiarism is a major academic dishonesty and follows academic ethics. It is subject to sanctions like penalties, suspension from the working place, and even dismissal. Plagiarism is not a crime, but involves copyright violation. Plagiarism is a serious ethical offence in educational institutions and business sectors. Plagiarism and copyright violation overlap with each other, but they are not equivalent concepts. Many types of plagiarism are not found in copyright violation, which is defined by copyright law but are punishable. Plagiarism is not defined. Although the individual committing plagiarism is not punished by law, he/she is punished by the institution where he/she works in. Most used plagiarism softwares are discussed in the following sub-sections.

Turnitin: Turnitin is an Internet-based plagiarism-prevention commercial service created by iParadigms, LLC, first launched in 1997. Typically, universities and high schools buy licenses to submit essays to the Turnitin website, which checks the documents for contents which are not original. The results can be used to identify similarities to existing sources or can be used in formative assessment to help students learn how to avoid plagiarism and improve their writing. This is proprietary software. Students may be required by schools to submit essays to Turnitin, as a deterrent to plagiarism. This has been a source of criticism, with some students refusing to do so, as according to them, it constitutes a presumption of guilt. Additionally, critics have alleged that use of this proprietary software violates educational privacy as well as international intellectual property laws, and exploits students’ works for commercial purposes by permanently storing them in Turnitin’s private database. (source: www.turnitin.com)

URKUND: URKUND offers a fully-automated system for handling plagiarism. In short, students send their documents to their teachers by e-mail. Along the electronic route between students and teacher, the documents are checked against three central source areas: Internet, published material and student material. If any document displays similarities with the content in the three sources, the
system flags it for possible plagiarism. An analysis overview is generated and sent by e-mail to the teacher concerned. The analysis overview presents in a simplified form the information needed by the teacher in order to determine if plagiarism has occurred.

URKUND works as:

STUDENT - Students send their documents via e-mail, web upload or LMS to their teachers/professors. With the e-mail option, no software needs to be installed.

URKUND - When the documents arrive at URKUND, they are analysed against the content of three source areas: the Internet, Published Material and Student Material. When the analyses are finished, the documents and generated reports are forwarded to the teachers.

THE TEACHERS - The result of the analyses and the student documents are forwarded to the teacher’s e-mail address of choice, straight into an LMS or the URKUND web-based in-box. URKUND provides easy, straight-forward plagiarism prevention with minimum workload. (source: http://www.urkund.com/)

16.3.6 Open Source and Open Content

In response to the complexities of the copyright regime, the open source movement has emerged in 1985 with the establishment of the Free Software Foundation (FSF)(http://www.gnu.org/) by Richard M. Stallman. The FSF had developed the General Public License (GPL) that is often called “copyleft” to allow programmers to release the software with its source code. In the year 1991, Linus Torvalds, a student of Helsinki University started a project that would spread to become the “poster child of open source” (Hart,2003). With the release of version 0.1 of the Linux Kernel as an operating system, open source as an alternative approach to software development became popular. In the mid-1190s, Netscape decided to publicize the source code of its browser, which led to the emergence of the Open Source Initiative (OSI)(http://www.opensource.org/) as an alternate institution to FSF. The OSI maintains that for any software to satisfy as open source,

• the source code must be disturbed with the software or otherwise made available for no more than the cost of distribution;
• the software be allowed for re-distribution without any royalty payment to the creator; and
• the user can modify the source code and then distribute the modified software under the same terms.

Sometimes, the software released under open source is also called “Free and Open Source Software” (FOSS). To a certain degree, open source software is free of charge to the extent that they do not charge licensing fee for usage. However, it should not be confused as “freeware” that are made available free of cost in their executable from without the source code. In case of open source, the free is as freedom, and can be seen as:

• freedom to access the source code;
• freedom to use the software without paying any license fee;
Support Systems, Legal and Ethical Issues

- freedom to re-distribute; and
- freedom to modify the software and distribute.

Open source software is becoming popular in education due to the cost advantage. The software is free, and thus no payments are to be made. However, some service providers may take training and maintenance charges. Today, almost all proprietary software has an open source alternative that you can find on the net. Following the open source movement, in 2002 with the initiative of the UNESCO, the open content movement started which is now popularly known as Open Educational Resources (OER).

OER has been defined as “the provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes” (UNESCO, 2002). So, open content materials follow an open licence policy thereby permitting other uses to use the work without permission. The emergence of Creative Commons licenses of OER has made it easier for creators of original work to specify the terms and conditions of use. Using OER materials, institutions can save money and avoid duplication of work. The UNESCO has developed a website for the promotion of OER (see http://oerwiki.iiep-unesco.org/). There are other such provisions available with huge content suitable for learners from kindergarten to lifelong learning. Some of these are:

- WikiEducator (www.wikieducator.org)
- Connections (www.cnx.org)
- Curriki (www.curriki.org)
- OER Commons (www.oercommons.org)

**Creative Commons**

Creative Commons is an organization set up to “enable the sharing and use of creativity and knowledge through free legal tools”. This comprises a set of copyright licenses that facilitate creators of pieces of intellectual property to classify the level of access they will allow others to their material.


**License Conditions**

Creative Commons specifically recommends an author to address the following issues before considering categorization of their work:

(see also http://wiki.creativecommons.org/Before_Licensing):

1) Ensure that the work produced is copyrightable.
2) Confirm that the author has the legal rights to claim authority over the work.
3) Be certain that they are aware of the full works, terms and aptitude of a CC license.
4) Know for sure what the author is licensing.
5) Verify that any affiliation the author has with any other party that has no other issue with the chosen license.
### 16.3.7 Privacy Policy

Privacy policies are one legal page that any site collecting any type of information from their customers should have. A privacy policy should cover:

- your use of cookies and other trackers;
- how you use personal information collected;
- who you distribute collected information to;
- contact information for erasing private information;
- information about third-party sites that might collect information (such as advertisers); and
- editing dates when the document is changed.

The sample given Box-1 is a privacy policy statement from guideline website [http://web.guidelines.gov.in](http://web.guidelines.gov.in)

**Box-1**

**Privacy Policy**

We do not collect personal information for any purpose other than to respond to you (for example, to respond to your queries). If you choose to provide us with personal information like filling out a Contact Us form with an e-mail address or postal address, and submitting it to us through the website, we use that information to respond to your message, and to help you get the information you have requested.

Our website never collects information or creates individual profiles for commercial marketing. While you must provide an e-mail address for a localised response to any incoming questions or comments to us, we recommend that you do NOT include any other personal information.
Check Your Progress

Notes: a) Write your answers in the space provided.
   b) Compare your answers with the one given at the end of the unit.

5) Define Plagiarism. What are two software commonly used for plagiarism check.

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6) What is creative commons? List the six CC licensing.

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16.4 TECHNOLOGY RESOURCES FOR AFFIRMING DIVERSITY

In order to meet the 21st century needs such as technological, informational, and interpersonal, schools need to implement instructional strategies which includes technological and interpersonal skills for students. Instructional strategies must include equitable access to technology and must encourage intercultural communication. While moving towards equitable access to technology, institution must facilitate multicultural teaching strategies by using educational technology. Teachers must get training or learn to integrate technology into multicultural teaching by keeping pedagogical and technological challenges. Teachers should work on higher-level thinking skills which requires synthesis and application of skills to new contexts. All the students need to have equal access to resources which include teaching, technology, and instructional materials, no matter what their races, colors, or national origins are.
16.5 TECHNOLOGY FOR EQUITABLE ACCESS TO RESOURCES

Let us first discuss ‘what is equitable access to resources?’ Equitable access means providing all access to technological devices like computer and Internet. Every student should have the opportunity to access to technology. The teacher also has the knowledge to use technology to provide quality learning experiences to students. Equitable access fills the socio-economic gaps and provide technology-based learning for all students. To achieve equitable access, institution must ensure provision of sufficient bandwidth and Internet connection speed for teaching and learning to happen at anytime and anywhere.

Why is equitable access important?

Technology has the power to reach the unreached people. It provides students an opportunity to access educational resources and interact with teacher using any means communication such as email, chat, discussion forum. Technology offers the way to enhance education for disadvantaged students. While planning for technology implementation, the institution must take care that students have minimum infrastructure at home to access the digital resources and at the institution for the students to access digital resources to enhance their knowledge and skill. Needs of students with special needs must be fulfilled by the technology.

Many education environments are now moving towards a Bring Your Own Device (BYOD) environment where students bring their own tablet, laptop or smartphone to institution. These devices are owned by them. Very often the government or community distributes devices to the students. For example, Tamil Nadu state government initiated a scheme to distribute laptop to the students who study in the government school. Similarly, central government came with Akash tablets for nominal amount. This facilitates students to access the device both at home and at institution for learning and interaction. Flipped class learning can be done where learning of the content is completed at home and students come to the class room for discussion and collaborative learning.

The Open Education Resources (OER) movement offers repository of digital resources that facilitate teaching and learning with free sharing of resources, pedagogy and materials.

16.6 IMPACT OF ICT ON SOCIO CULTURAL ISSUES

Technologies have a major impact on society, especially social media. The integration of new technologies into society, mainly the family, is having a major influence on social interaction among people. Literature on this area mentioned that technologies impact the social interaction within families. Technologies help to connect generational gap and digital divides. However, because of social media, family members spend less time together among themselves. Thus, communications among family members are reduced. A lack of communication
Support Systems, Legal and Ethical Issues

among family members can have unfavorable impact on unity of the family. This leads to unhealthy relations among members within a family. According to Aarsand (2007), devices and social media such as “video games, computer games, Facebook, Instagram, WhatsApp and email” are now an integral part of children’s everyday lives. A digital divide has been created in the society. Digital divide is “the difference between those who know and those who do not know how to act in a digital environment” that means “a generation gap between those who master and do not master digital technology” (Aarsand2007).

16.6.1 ICT and Child Development

The desktop has been replaced with smart phones nowadays. Smart phones have all the features than a desktop has and allow students to text, chat, send images, and audio/video clips and post any time anywhere directly to each other through social media. Mobile devices especially smart phones are used by teenagers and have become part of their routine life. Because of the peer pressure, children force their parents to buy sophisticated mobile devices. Nowadays schools are not allowing students to bring mobiles to the school. Social media have good and bad information. Children may tempt to open bad information. Parents and teachers need to play an important role these days because the world is on click for our children. A child can connect other end of the world irrespective of any time and any space. One should be very careful in the digital world.

However, smart phones and mobile devices can be used for teaching and learning. Most schools use blended approach to teaching-learning. Teachers create discussion forum, Students interact and share the information among themselves through WhatsApp groups. Peer interaction and collaborative projects can be encouraged among students. Many schools have integrated ICT in their teaching learning process. ICT helps students update knowledge and skills. Since ICT has created both good and bad digital environment, parents and teachers should guide students properly to enrich their knowledge and skills using ICT.

16.6.2 Cyberbullying

Cyberbullying is the modern form of bullying done over the web. Cyberbullying is one of the most mentally destructive problems that people face today. Many young people spend most of their time in social media. When they come across negative words, images, and messages in the social media, they are psychologically disturbed. With the continuous addiction to social media, it is getting difficult to prevent cyber bullying. Apps and sites such as Whatsapp, Instagram, Snapshot, Facebook, Twitter, etc. are mostly used by the young people. Sometimes, they become victims of cyberbullying in these Apps and sites. We need new strategies to address and prevent cyberbullying in today’s hyper connected world. Let us discuss how to prevent cyberbullying? Sameer H. and Justin W. P. (2012) provided ten tips for teenagers to prevent cyberbullying. The following figure-1 explains how to prevent cyberbullying.
Preventing Cyberbullying
Top Ten Tips for Teens

Sameer Hinduja, Ph.D. and Justin W. Patchin, Ph.D.

January 2012

1. Educate yourself
To prevent cyberbullying from occurring you must understand exactly what it is. Research what constitutes cyberbullying, as well as how and where it is most likely to occur. Talk to your friends about what they are seeing and experiencing.

2. Protect your password
Safeguard your password and other private information from prying eyes. Never leave passwords or other identifying information where others can see it. Also, never give this information to anyone, even your best friend. If others know it, take the time to change it now!

3. Keep photos “PG”
Before posting or sending that sexy image of yourself, consider if it’s something you would want your parents, grandparents, and the rest of the world to see. Bullies can use this picture as ammunition to make life miserable for you.

4. Never open unidentified or unsolicited messages
Never open messages (emails, text messages, Facebook messages, etc.) from people you don’t know, or from known bullies. Delete them without reading. They could contain viruses that automatically infect your device if opened. Also never click on links to pages that are sent from someone you don’t know. These too could contain a virus designed to collect your personal or private information.

5. Log out of online accounts
Don’t save passwords in form fields within web sites or your web browser for convenience, and don’t stay logged in when you walk away from the computer or cell phone. Don’t give anyone even the slightest chance to pose as you online through your device. If you forget to log out of Facebook when using the computer at the library, the next person who uses that computer could get into your account and cause significant problems for you.

6. Pause before you post
Do not post anything that may compromise your reputation. People will judge you based on how you appear to them online. They will also give or deny you opportunities (jobs, scholarships, internships) based on this.

7. Raise awareness
Start a movement, create a club, build a campaign, or host an event to bring awareness to cyberbullying. While you may understand what it is, it’s not until others are aware of it too that we can truly prevent it from occurring.

8. Setup privacy controls
Restrict access of your online profile to trusted friends only. Most social networking sites like Facebook and Google + offer you the ability to share certain information with friends only, but these settings must be configured in order to ensure maximum protection.

9. “Google” yourself
Regularly search your name in every major search engine (e.g., Google, Bing, Yahoo). If any personal information or photo comes up which may be used by cyberbullies to target you, take action to have it removed before it becomes a problem.

10. Don’t be a cyberbully yourself
Treat others how you would want to be treated. By being a jerk to others online, you are reinforcing the idea that the behavior is acceptable.

Source: www.cyberbullying.us

Cyberbullying Research Center

Fig. 16.1: How to Prevent Cyberbullying

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16.6.3 Addiction, Anxiety and Stress Creation Using Technologies

Internet addiction is a disorder often caused by overuse of Internet. It may lead to anger, tension anxiety and unwanted behaviour. It is extremely damaging to person’s health and social life. Internet addiction is growing at a fast rate and becoming a mental health problem. It leads to social, psychological and physical disorders. The people who have ‘technology addiction’ have physical problems such as sleep disturbance, back strain, eye strain, etc. They also face problems in family, workplace and social life leading to anxiety, stress and depression, wasting time, neglecting school work, responsibilities at home, and even not interacting with family members. It makes them more introvert and minimizes their interaction with family and society. Excessive use of the Internet can reduce concentration.

One should have self-discipline to use Internet and technologies to prevent the addiction. Parents, elders and teachers should keep an eye on their children for using Internet.

16.7 LET US SUM UP

In this unit, we discussed the social, legal and ethical issues on the use of ICT. We discussed ICT phobia, the symptoms of fear and how to overcome ICT phobia. We discussed ICT policies and internet filtering which facilitate safe use of resources available on the Internet. You also learnt about the copyright issues in the digital world. The open source, open content and creative commons licensing were explained. Technology resources to affirm diversity were discussed emphasizing that instructional strategies must include equitable access to technology for all students. Towards the end of this unit, we discussed impact of ICT on socio-cultural issues in which you have learnt ICT and child development, cyberbullying, addiction to technology, etc.

16.8 SUGGESTED READINGS AND REFERENCES


Hart, T. (2003). Open Source in Education. Unless otherwise expressly stated, all material is licensed under the Creative Commons Attribution-NonCommercialShareAlike License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-sa/1.0/ or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA.


16.9  **ANSWERS TO CHECK YOUR PROGRESS**

1) Cyberspace is called online or internet environment. Cyberspace has provided space for faster growth of social media, different types of communication media became possible namely, interactive communications such as email, Facebook, twitter etc.

2) To overcome from the ICT phobia the following steps can be followed:
   - People who have ICT phobia can get training to practice new technologies for improve self-confidence.
   - Young people must provide support and help the older people suffering from this phobia. They should motivate and reward for their effort to overcome the fear of technology.

3) ICT policy on school education was developed in the year —2012—

4) Internet filter is a software tool that allows parents, teachers and administrators to control the list of permitted and blocked websites. Originally, Internet filters were used at homes and at public schools and libraries. Eventually, the Internet filters incorporated into businesses, private sectors to control internet use in the workplace. This facilitates to prevent employees from wasting work time and protecting the internet from the malicious content.

5) Plagiarism is measured academic dishonesty and follows academic ethics. It is subject to sanctions like penalties, suspension from the working place, and even dismissal. Plagiarism is not a crime, but can found copyright violation.
   Trunitin and Urkund are commonly used plagiarism software.

6) Creative Commons is an organization set up to “enable the sharing and use of creativity and knowledge through free legal tools”. This comprises a set of copyright licenses that facilitate creators of pieces of intellectual property to classify the level of access they will allow others to their material.

   CC licensing are (i) CC BY (ii) CC BY-SA (iii) CC BY-ND (iv) CC BY-NC (v) CC BY-NC-SA (vi) CC BY-NC-ND