
UNIT 14 LEARNING SUPPORT SYSTEMS

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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 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 these 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/>)

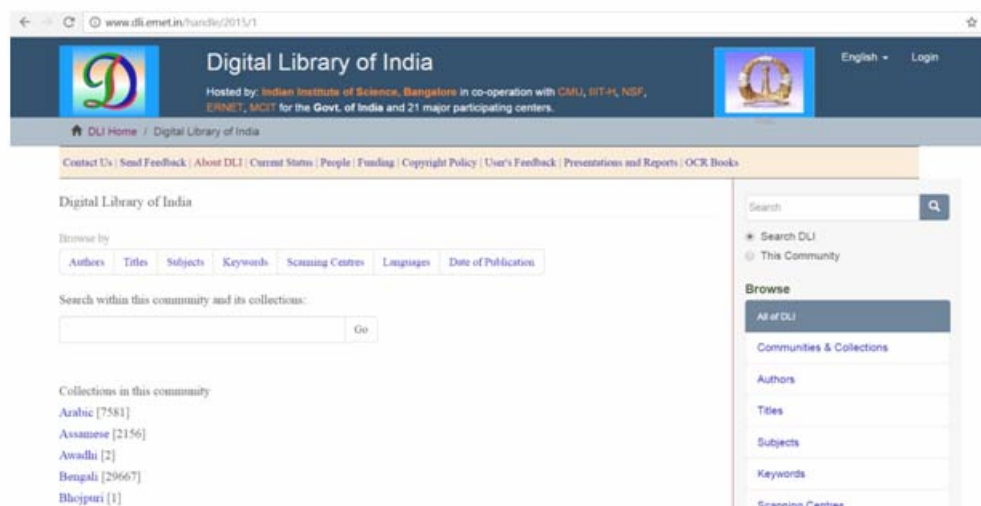


Fig. 14.1: Digital library of India

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.

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

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” (Antonucci 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/>
- Cyber Town: http://www.cybertown.com/main_iframes.html
- 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.

The Defense Modeling and Simulation Office of US categorize training simulations into three types (<http://en.wikipedia.org/wiki/Simulation>):

- 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.;

- 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, stop-watches, 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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4) Give three uses of simulation in education.

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 comfort:** 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.

14.6 ICT FOR SHARING LEARNING RESOURCES

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>).

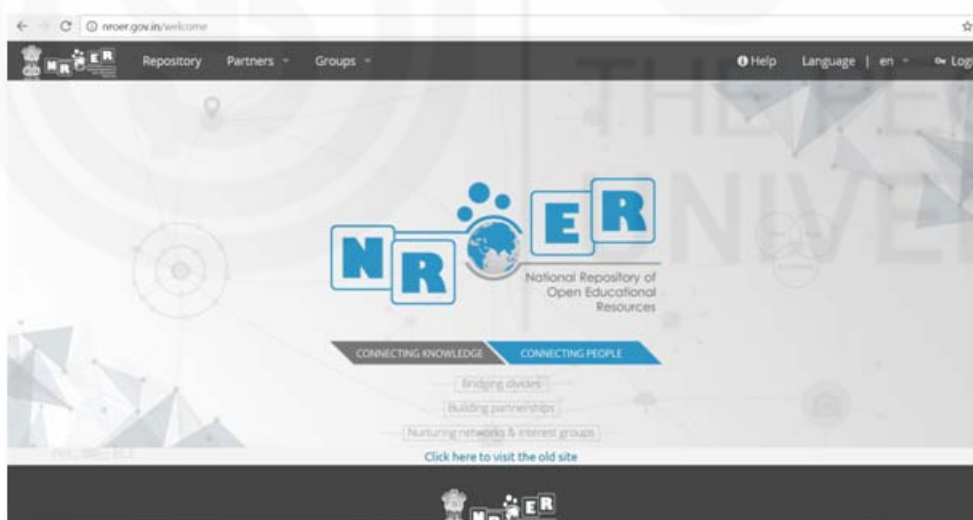


Fig. 14.3: Home page of National Repository of OER (NROER)

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.

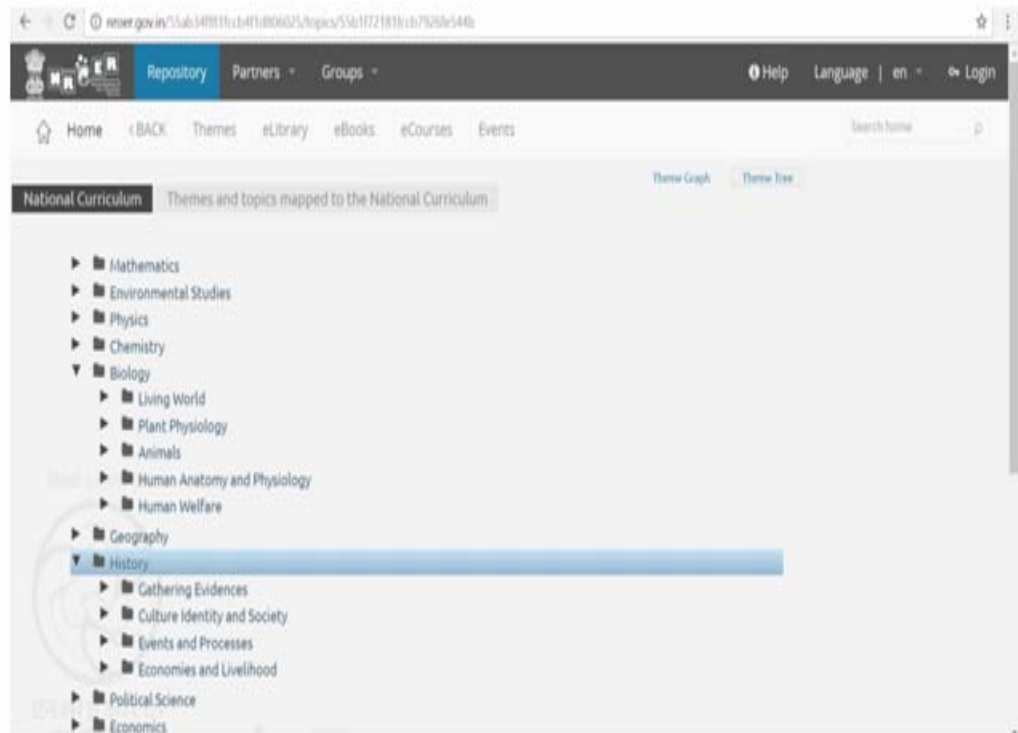


Fig. 14.4: Theme-wise mapping in NROER

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

- Wikis
- RSS and syndication
- Tagging and social bookmarking

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 became 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 from 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 Hawaii 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

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

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.

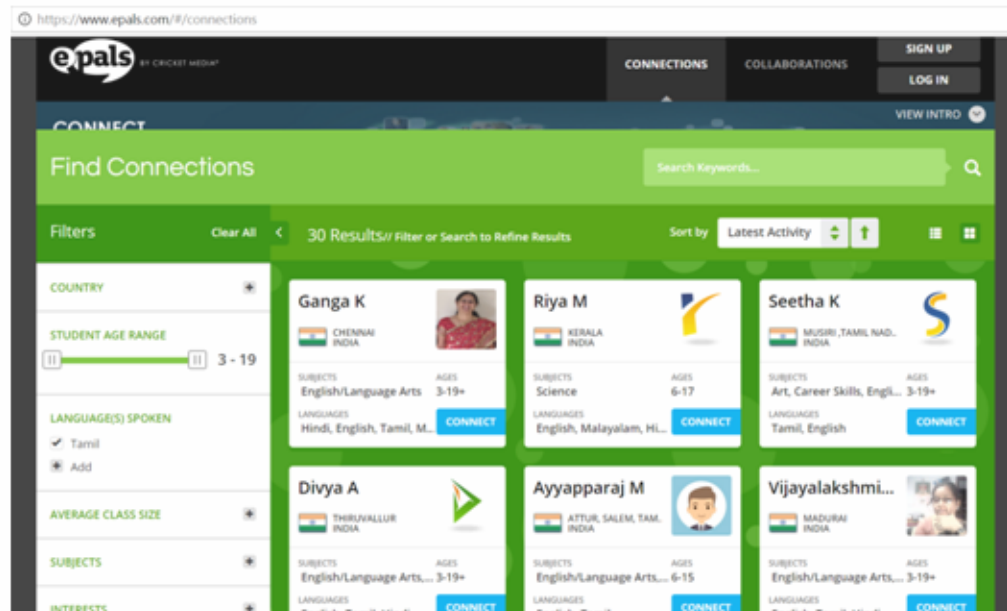


Fig. 14.6: List of people available in EPALS who spoke Tamil language

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.

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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.
 - Lerner develop interconnection and collaboration by posting comments.

