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Electronic Learning Technologies

Kiran Lata Dangwal

Department of Education, University of Lucknow, Uttar Pradesh, India

Corresponding author: kldangwal@yahoo.co.in

ABSTRACT

ICT today has the power to transform Education. A greater flexibility is provided through online access to learning – when, where and how to do it? Today anyone can obtain education anywhere, anytime through online education. Thus, breaking the shackles of traditional classroom and adapting to new and electronic learning Technologies empowers all learners irrespective of their diversities. This development in ICT has resulted in a learning environment called e-learning.

Keywords: e-learning, blended learning, Synchronous and Asynchronous e-learning, Learning Management System (LMS)

E-learning- Concept and Characteristics

This term is used synonymously with virtual learning, online learning, computer based learning, web based learning, and networked learning. What is e-Learning? E-learning is essentially imparting education through computer and network enabled digital technologies which include among other things, internet, intranet, computer, satellite TV, CDROM, audio and video resources. Therefore e-learning could be broadly defined as use of Information and Communication Technology (ICT) to enhance and support learning.

Definition of E-learning

The letter "e" in e-learning stands for the word "electronic", e-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline via networked or standalone computers and other electronic devices.

Rosenberg: "E-learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance." Rosenberg claims that e-learning is based on three fundamental criteria:

"E-learning is the delivery of education (all activities relevant to instructing, teaching, and learning) through various electronic media" Thus, E-Learning is the use of technology to enable people to learn anytime and anywhere. E-learning can include training, the delivery of just-in-time information and guidance from experts. E-learning could also be considered distance education in an evolved form, which has taken advantages of all the emerging technologies for enhancing learning experiences of every learner. In that sense e-learning could be considered as a new generation of distance education.

Characteristics of E- learning

- **E-learning is Learner-Centric Learning:** The learner centric e-learning model makes an array of resources available to the learner, who is free to choose when, where and how to learn.
- **E-learning is Flexible Learning:** E-learning has historically been linked with distance education and flexible learning. In distance education, various technologies can be used to link learners, instructors and resources that are removed in time or space.
- **E-learning Involves Learning Objects**: E-learning uses reusable learning objects. This RLO permits one to create e-learning course with ease.
- **E-learning Involves Effective Communication:** The effectiveness of e-learning also depends on establishing two-way communication between teachers and learners, and among learners themselves. There are many standalone tools as well as learner management system integrated tools to foster interactive and collaborative engagement.

History of E- learning

- In the early 1920s Sidney Pressey developed a machine to provide drill and practice items to students in his introductory courses.
- During the 1950s Skinner presented the content in small, related chunks of information. Skinners Programmed Instruction was very popular and at this very moment, programmed instruction was popular when it comes to digital self-study courses.
- Stanford University Psychology professor Patrick Suppes and Richard Atkison began using computer aided instruction (CAI) to maths and readings to young children.
- Computer mouse and the GUI are invented helping to define modern computing. Computer based training begins at New Jersey institute of Technology.
- Personal computer era begins with Macintosh.
- The first digital natives are born. Email takes off. It's the dawn of a new era of learning. Virtual learning environments begin.

A new wave of eLearning inspired by social media builds momentum. YouTube, twitter, MOOC etc. emerges. Opportunity to connect, share information and learn from each other are found everywhere.

APPROACHES TO E-LEARNING

E-learning can be provided in many ways as given below:

- ❖ Synchronous versus Asynchronous
- ❖ Networked versus Stand alone
- ❖ Individual versus Group
- ❖ Online versus Offline
- ❖ Internet versus Intranet
- ❖ Computer based versus Other digital devices
- ❖ Blended versus Fully online
- ❖ Self-paced versus Instructor lead

Some of these approaches are explained below:

Synchronous E-learning

Synchronous e-learning involves online studies through chat and videoconferencing. This kind of learning tool is real-time. It is like a virtual classroom which allows students to ask, and teachers to answer questions instantly, through instant messaging, which is why it is called synchronous. This is commonly supported by media such as Video Conferencing, Virtual Classrooms and Chat sessions. The most familiar form of synchronous electronic communication is real time two way text-based online chat, which is widely used in e-learning. More sophisticated forms of synchronous instruction include virtual classrooms, which use information and communication technologies to mimic a traditional classroom environment.

Asynchronous E-learning

On the other hand, Asynchronous learning can be carried out even while the student is offline. Asynchronous e-learning involves coursework delivered via web, email and message boards that are then posted on online forums. You can check your e-mail at your convenient time. Thus Asynchronous means you need not be online at the same time. This Asynchronous E-learning is commonly facilitated by media such as e-mail and discussion boards, supports work relations among learners and with teachers, even when participants cannot be online at the same time.

Asynchronous instruction allows participants to control their own timetables and fit learning around their other commitments. Many of the technologies used in asynchronous e-learning also permit two way communication between learners and instructors, or multi-directional, collaborative communication among learners themselves.

Blended Learning

Blended learning, also known as hybrid learning, is a combination of face-to-face and online instruction. The teacher connects personally with the students in the brick-and-mortar classroom and that relationship extends online. In blended learning e-learning is being combined with traditional classroom methods and independent study to create a new, hybrid teaching methodology. Many use terms like hybrid, mixed, or integrative to describe the same trend. In a blended-learning course, for example, students might attend a class taught by a teacher in a traditional classroom setting, while also independently completing online components of the course outside of the classroom. In this case, in-class time may be either replaced or supplemented by online learning experiences, and students would learn about the same topics online as they do in class—i.e., the online and in-person learning experiences would parallel and complement one another.

The blended learning will have the essential requirement of:

- ❖ In-person classroom activities facilitated by a teacher.
- ❖ online learning materials provided through a website, bog, or LMS.
- ❖ structured independent study and assignments both face to face and online mode.

Blended learning can provide the convenience, speed and cost effectiveness of e-learning with the personal touch of traditional learning. Students can prepare for, consolidate and recall classroom experiences online, while gaining the benefits of interaction with teachers and students via an actual or virtual classroom. Student learning and retention rates improve without sacrificing the convenience, cost-effectiveness and customization of self-paced Web-based coursework.

Individual versus group

Individualized e-learning refers to situations where an individual learner is accessing learning resources such as a database or course content offline or online via an Intranet or the Internet. A typical example of this is a learner studying alone or conducting some research on the Internet, local network or using a CD or DVD.

In group-based e-learning refers to situations where groups of learners are working together in real time or with time delay via an Intranet or the Internet. It may include text-based

conferencing, online discussion forum, electronic mailing, and one or two-way audio and videoconferencing. Examples of this include learners engaged in a real-time chat or an audio-video conference.

Self-paced versus Instructor Lead

In self-paced approach the e-learning courseware is usually made available through an online learning platform or on CD-ROM. Learners are free to choose the learning activities and learn at their own pace based on individual needs and interests. E-learning content is developed according to a set of learning objectives and is delivered using different media elements, such as text, graphics, audio and video. It must provide as much learning support as possible (through explanations, examples, interactivity, feedback, glossaries, etc.), in order to make learners self-sufficient.

Whereas in instructor lead, the course is scheduled and led by an instructor and/ or facilitator through an online learning platform. E-learning content for individual study can be integrated with instructor's lectures, individual assignments and collaborative activities among learners. Learners, facilitators and instructors can use communication tools such as e-mails, discussion forums, chats, polls, whiteboards, and application sharing and audio and video conferencing to communicate and work together. At the end, a final step typically includes an exercise or assessment to measure learning.

E- LEARNING TOOLS AND TECHNOLOGIES

E-learning is a flexible learning environment which serves a number of individual and organizational purposes by making use of a number of technologies. There are many tools and technologies essential for e-learning and many of these tools come in handy as a standalone to deliver learning using variety of approaches to e-learning. In addition we also have many Learning Management Systems which integrate many of the individual tools into a single platform to develop and deliver online learning. A comprehensive list of e-learning tools and technologies are provided in the following table.

E-learning Communication Tools

E-learning tools can provide training and education to large number of students with diverse cultural backgrounds and educational levels. The most common Communication tools used in e-learning include, e-mail, Instant Messaging and Blogging.

E-mail: E-mail stands for electronic mail; e-mail is defined as the transmission of messages over communication networks. There are many e-mail service providers and the most famous ones are Yahoo mail and G mail. Exchanging-mail messages with a mentor or peer is an e-learning experience.

Instant Messaging (IM): Instant messaging is the exchange of text messages through a software application in real-time. Instant messaging allows learners to chat with one another through text messages. This has become very popular as here, everything is performed in a faster, more reliable and cohesive manner. Instant messaging helps teachers to create subject specific groups for exchange of information and sharing of resources. Instant messaging applications like WhatsUp are extensively used by teaching community as reliable communication tool.

Chat: Chat is synchronous communication tool facilitating online communication. This tool helps teachers and learners to schedule a discussion on a particular question or theme and later save the chat discussion for later use. The chat tool is an integrated tool in all the LMS and there are many standalone chat applications which can be used outside the LMS.

Blogging: A blog is your own website that you are going to update on an on-going basis. A blog is a frequently updated online personal journal or diary. It is a place to express yourself to the world and to share your thoughts and your passions. In blogs entries are commonly displayed in reverse-chronological order. Most blogs are interactive, allowing visitors to leave comments and even message each other via widgets on the blogs and it is this interactivity that distinguishes them from other static websites

Collaboration Tools

All around the globe we are witnessing the transition towards collaborative learning. The benefits of collaborative learning are immense. It lets the learners gain from the experience of their peers and help them acquire and retain information in a more involved and engaged way. Thus, we see most of the e-learning is also social. The learners learn through collaboration with peers in smaller or larger groups. The e-learning technology offers a number of collaboration tools to learn from one another, to work on assignments, Projects in groups and the like. Some of the popular collaboration tools include Chat, forum, wiki, online groups, audio/ video conferencing, social bookmarking and social networking.

Collaborative learning forums promote learner interaction through message boards, where students can post questions and answers; text chat or forums, where learners can communicate outside the main classroom; and threaded discussions, where facilitators and students can discuss a given topic and review each other's responses.

Wiki: A wiki is a collaborative web site that collects and organizes content, created and revised by its users. The most well-known example is Wikipedia. Wikis are a way to grow a knowledge base around a particular content area, be it best practices in a particular field or how to use a specific piece of software. Wiki is also a feature available in all the Learner Management System. In an e-learning context wiki permits teachers to give many kind of task to the learners to collaborate and create content on any topic.

Social Bookmarking: A social bookmarking service is a centralized online service which enables users to add, annotate, edit, and share bookmarks of web documents. Social bookmarking websites enhance and improve the learning experiences by encouraging group collaboration. Social bookmarking services offer greater scope for research, integration, and collaboration compared to the more traditional bookmarking applications such as browsers, which offer limited functionality.

Web Conferencing: Web conferencing is highly interactive, Internet-based applications with a rich collaboration feature set (e.g. audio/video from presenters and learners, application sharing, white boarding and markup tools, breakout rooms, polling, quizzing, hand raising and emoticon responses, slides and media, Web site tours, public/private text Chat). In "synchronous e-learning," we refer to Web conferencing. Web conferencing technologies offer tremendous potential for robust interactivity and collaboration through their versatility and rich feature options.

Content Creation Tools/Authoring tools

An e-learning content authoring tool is a software package which developers use to create and package e-learning content deliverable to end users. The category of content-authoring tools includes HTML, Flash, and various types of e-learning authoring tools."Thus, e-learning authoring tools are a class of products designed for people who need to create online educational or training courses that are deployed from a standard, cloud-based learning management system. Many programs can be considered authoring tools, including Flash, and PowerPoint.

Adapt: The Adapt authoring tool is an application to allow you to quickly build responsive e-learning content. It's accessed through a web browser. You can create an account, log in, create courses and add assets, components and extensions. You can preview and publish your e-learning content from the authoring tool.

LAMS: Learner Activity Management System (LAMS) is a revolutionary new tool for designing, managing, and delivering online collaborative learning activities. It provides teachers with highly intuitive visual authoring environment for creating sequence of learning activities.

Delivery and Distribution Tools

There are many options to deliver e-learning today. Most common approach is to deliver online learning using a Learner Management System which has so many e-learning tools and technologies integrated in one place. The other approach gaining popularity currently is Massive Open Online Course (MOOC) format. A massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. In addition to these two approaches e-learning can also be delivered

as flipped learning in which the typical lecture and homework elements of a course are reversed. WebQuest is an inquiry-oriented lesson format in which most or all the information that learners work with comes from the web. The e-learning could also be delivered or distributed through websites, as webcast, podcast, e-pub, streaming video, webinars, virtual tours and games.

EPUB: Wikipedia defines EPUB as an e-book file format with the extension epub that can be downloaded and read on devices like smart phones, tablets, computers, or e-readers. It is a free and open standard published by the International Digital Publishing Forum (IDPF). The term is short for electronic publication and is sometimes styled ePub. Sigil is an open source epub authoring tool and caliber is an open source epub reader.

Podcasting: Podcasting is a form of audio broadcasting on the Internet. The audio files are developed and distributed using RSS to the computers of subscribed users. These files may then be uploaded to digital music or multimedia players like the iPod. A podcast can be easily created from a digital audio file. The podcaster first saves the file as an MP3 and then uploads it to the Web site of a service provider.

Vodcasting (video-on-demand casting) is the same principle as Podcasting with the addition of video. Podcasting/Vodcasting allows educators to reach students using a medium they are accustomed to. It can be used to interact with students and parents beyond the school hours and can be a great facilitator to increase student engagement. Student created podcasts/ vodcasts give students the opportunity to enhance their organization, communication and technology skills.

Record classroom lectures, provide supplemental information, provide review sessions, record classroom discussions, interview with experts, student projects are some of the uses of podcasts. Therefore podcast is versatile medium for delivering e-learning specifically audio content.

Audio/Video Streaming: Streaming Audio/Video is content sent in compressed form over the internet and displayed by the viewer in real time. With streaming video or streaming media, a Web user does not have to wait to download a file to play it. Instead, the media is sent in a continuous stream of data and is played as it arrives. The services offered by YouTube are valued by e-learning providers world over. Many institutions have created their own exclusive channels for providing their e-content to the end users using YouTube. E-learning professionals use to make their e-learning courses more interactive, fun, and informative using YouTube

MOOC: Massive Open Online Course (MOOC) is a new approache to delivering e-learning. MOOC is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. Some of the famous MOOC providers are edX, Coursera, and Udacity. The Indian MOOC initiative is known as SWAYAM.

Flipped Learning: One popular approach to online learning is the flipped classroom. In a flipped classroom, students review content at home and then apply that learning in the classroom. This model establishes a foundation of knowledge (outside of class) and then uses instructional time in the classroom to expand upon that foundation. The flipped classroom describes a reversal of traditional teaching where students gain first exposure to new material outside of class, usually via reading or lecture videos, and then class time is used to do the harder work of assimilating that knowledge through strategies such as problem-solving, discussion or debates.

WebQuest: Web Quest developed in 1995 by Bernie Dodge of San Diego State University. Simply put, a WebQuest is an inquiry-based activity where students are given a task and provided with access to on-line resources to help them complete the task. WebQuest is an online-based lesson in which most or all of the information that students explore and evaluate comes from the World Wide Web. According to Bernie Dodge, the six building blocks of a Web Quest are :-

1. The Introduction orients students and captures their interest.
2. The Task describes the activity's end product.
3. The Process explains strategies students should use to complete the task.
4. The Resources are the Web sites students will use to complete the task.
5. The Evaluation measures the results of the activity.
6. The Conclusion sums up the activity and encourages students to reflect on its process and results.

LEARNING MANAGEMENT SYSTEM (LMS)

After so many years of technology use in education, it is felt that educators today need a web-enabled relational database that links curriculum, instructional resources, assessment strategies, student data, and staff proficiencies all on a single platform. This is possible by adopting a comprehensive and systemic integration of a multi-dimensional system called Learning Management System (LMS). LMS provide an infrastructure platform through which learning content is delivered and the learning and learners are managed. It provides a combination of software tools that perform a variety of functions related to online and offline training administration and performance management. Typically, an LMS is internet-based software that deploys, manages, tracks, reports on the interaction between the learner and the content, and the learner and the instructor. Administratively, an LMS makes it easy to enter, track, manage, and report on learning activities and competencies. An LMS is not limited to e-learning and can also manage other forms of instruction. In essence, an LMS primarily focuses on competencies, learning activities, and the logistics of delivering learning activities.

ADVANTAGES AND POTENTIAL DRAWBACKS OF E-LEARNING

Advantages of e-Learning to the Trainer or Organization

- ***Reduced overall cost*** is the single most influential factor in adopting e-learning. The elimination of costs associated with instructor's salaries, meeting room rentals, and student travel, lodging, and meals are directly quantifiable.
- ***Increased retention*** and application
- ***Consistent delivery*** of content is possible with asynchronous, self-paced e-learning.
- ***Expert knowledge*** is communicated, but more importantly captured, with good e-learning and knowledge management systems.
- ***Proof of completion and certification,*** essential elements of training initiatives, can be automated.

Advantages to the Learner

- ***On-demand availability*** enables students to complete training conveniently at off-hours or from home.
- ***Self-pacing*** for slow or quick learners reduces stress and increases satisfaction.
- ***Interactivity*** engages users, pushing them rather than pulling them through training.
- ***Confidence*** that refresher or quick reference materials are available reduces burden of responsibility of mastery.

Potential drawbacks

Technology dependent: Learners will need access to a machine of minimum specification as dictated by the e-learning supplier or access to a service with a high bandwidth to transfer the course materials in a timely way.

Material Incompatibility: Some materials designed for one particular system will not function properly on another (for example, the Apple Macintosh and the Windows PC). Standards will help in the area.

Unsuitable for Certain Types of Training: Any skill that relies heavily on inter-personal contact although these courses could be supplemented by e-learning.

Unsuitable for Certain Types of Learners: e-learning requires a high-level of self-discipline and personal time management. E-Learners need to be highly self-motivated to take full advantage of the medium as often the online learning experience can be impersonal. Working through 'packaged' programmes can be irritating.

Reliant of the Quality of the Content: It is too easy for some institutions to defer the photocopying costs onto the learner by placing all lecture notes and course handouts online. Such practices often mean that the course materials are in an inappropriate format for online learning. Course providers need to develop new technical skills and course design skills to suit the new medium.

Expensive: Start-up cost of an e-learning service is expensive and the cost of production of online training materials is very high. Teachers must be confident that the extra costs are balanced with the benefits of delivering a course online. Significant time needs to be invested in course set-up and in ongoing maintenance (checking links, updating course content etc.).

Reliant on Human Support: E-learning is still dependent on help on either the course materials or the software.

Social/economic disadvantage: It can limit or prevent access by some student groups (for example, cost of equipment, online access and printing).

No Match for Face-to-Face Teaching: Electronic communication does not necessarily provide a good match for face-to-face communication and is more linear than face-to-face discussion.

Too Reliant on IT Skills: Learners may have limited IT skills, or be uncomfortable with electronic communication and need to learn how to use the medium effectively.

Disabilities: Students with visual or physical impairments may be disadvantaged.

Inflexible: Flexibility may be lost as adjustments to the course in response to student reaction are not easy to make once the course is underway.

Pedagogically Unsound: The electronic environment does not per se offer a pedagogically enhancing learning environment.

LET US SUM UP

E-learning is instruction that is delivered electronically, in part or wholly via a Web browser, through the Internet or an intranet, or through multimedia platforms such as CD-ROM or DVD":

- E-learning methods can be classified into Synchronous, Asynchronous and Blended Learning Methods.
- Modern Technology provides us with a plethora of options for communicating. The most common Communication tools used in E-learning include, e-mail, Instant Messaging and Blogging.
- Some of the popular collaboration tools of e-learning include Chat, forum, wiki, online groups, audio/video conferencing, social bookmarking and social networking.
- LMS is the framework that handles all aspects of the learning process.

- LCMS focuses on the development, management and publishing of the content that will typically be delivered via an LMS. Users can both create and re-use content and reduce duplicated development efforts.
- MOODLE is a popular open source LMS.
- There are several organizations working toward standards and to make sure learning content is 'interoperable' with various learning management technologies. The e-learning standards support- Interoperability, durability, manageability, re-usability, and accessibility. These standards focus on content metadata, content packaging, and run-time communication to support tracking of student activities.

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