CHAPTER-2
THEORETICAL OVERVIEW

Theory element is an indispensable part of a concept. Discoveries and inventions never exist until it has a theoretical base. This chapter deals with the theoretical aspects of the strategy involved in the study. In the present study Investigator is ‘Developing an E-Learning strategy for teaching Biology at Higher Secondary Level’.

The development of computer technology has been most rapid, passing within a period of two or three decades from the bulky, complicated and costly hardware stage to the present one of compact, efficient and comparatively cheap stage. The enormous memory capability, the amazing speed of operation through which solutions to various problems can be arrived at instaneously makes the computer an indispensable tool.

The National Centre for Educational Statistics (2003), USA, reveals that approximately one computer is available for every five students and 98% of the schools and 77% of the instructional classrooms have access to the internet.

Information is a resource which, like unmined mineral wealth, has no value until extracted, processed and utilized. At the same time the amount of information being generated today is astronomical and the problem relating to its storage, dissemination and analysis are testing human ingenuity. In India
personal computers and electronic mails have become common. Educational television and multimedia have been introduced. Fortunately new technologies are being developed at an extra-ordinary rate and this ensures an existing contest between generalization and utilization of information.

Information and Communication Technology (ICT) is being accorded increasing importance within the school curriculum. It prepares pupils in developing skills, knowledge and understanding, in the use of ICT. ICT tools enable pupils to access, share, analyze and present information gained from a variety of sources in many different ways.

Educators have been talking about the enormous potential of electronic based education and training but change has been slow and steady. Computer Aided Video Instructions (CAVI), Hypermedia, Multimedia, CD ROMs, LANs, Internet connection and Collaborative software environments are some of the technology which makes a new wave of teaching tools. Computer Assisted Instruction (CAI) paves way for a new way of thinking in educational theory. Instead of one way information flow- followed by a teacher addressing a group of passive students, new teaching techniques involve more students, more teacher interaction (two-way) and collaboration between students and interdisciplinary approaches.
Online instruction is the most recent form. It is commonly termed as distant education that incorporate satellite courses, computer based programs, video television and correspondence or home study courses. These methods attempt to move educational opportunities out from a traditional centralized classroom. Online education programme represents a learning domain unlike any of the technology based academic delivery system. It incorporates the group qualities of interactive classroom based learning while enabling individual students to participate in any program. Online education is developing into a viable, cost-effective solution to the dilemma of delivering education to remote areas.

Online education is possible by the use of Internet. Internet is a computer related phenomenon. In the matter of information transformation, Internet can be useful in many ways as listed below:

- Exchange of e-mail with any of the millions of people with e-mail addresses. At present there are about 40 million people on the internet.
- Search for, retrieve and read literally millions of files stored on computers throughout the world.
- Send or receive sound, animation and picture files from very distant places.
- Browse through resources of private or public information services that are on the internet.
- Communicate in real time with others connected in the internet.

All these are some of the uses of internet; but the possibilities of its uses are enormous.

All the content of Internet is held by computers known as the Servers which are owned by organizations and companies. When a request is made of these servers for the information, they bundle the requested information in small packets with the address where is to be sent and send them to the nearest connection to the internet. When they arrive at the point, the packets are read by the router and sent down to the address. For transmission, the internet is dependent on the existing infrastructure developed by long-haul telephone companies and other telecommunication companies. Every organization has its own network and every individual user has own system and setup.

Internet has been in India for many years in the form of ERNET (Educational Research Network). However, it was not possible for many people to get access to it as it was meant for only the educational and research communities.
E-LEARNING

The term ‘E-Learning’ in general refers to learning facilitated and supported through the use of information and communication technology. It can cover a spectrum of activities from supported learning, to blended learning, to learning that is entirely online. E-Learning, therefore, is an approach to facilitate and enhance learning through both computer and communications technology. E-Learning today allows students to get fully involved in interactive and collaborative learning processes through the use of internet – may be through asynchronous activities like e-mail, discussion forum, blogs, wikis or through synchronous activities like choice sessions, video conferencing etc. A web based learning management system allows students to have access to rich digital content in multiple format and try out different things with the inbuilt high level of interactivity features and makes the learning community based through the access to teachers and fellow learners.

There are many software systems designed to facilitate E-Learning. Such E-Learning systems are sometimes called Learning Management System (LMS), Course Management System (CMS), Learning Support System (LSS) and Virtual Learning Environments (VLE). Using these systems, teachers can manage the online educational courses for their students; especially it helps teachers and learners with course administration. The system can often track the learner’s
progress, which can be monitored by both teachers and learners. Components of these systems usually includes templates for content pages, discussion forums, chat, quizzes and exercises such as multiple choices, true/false and one-word answers. Teachers develop these activities and upload them for learners to use.

**Components of E-Learning**

E-Learning comprises of the following elements (Shintaro, 2003).

**Content Delivery Method:**

Contents of traditional learning system are mostly based on text. But as in the case of E-Learning, audio or video materials may accompany texts, E-Learning allows content to be adjusted and supplied according to the level or progress of the individual learners. It also supports simulation as a way of testing skills in performing some activities that would be difficult to do in a real life, such as the handling of hazardous materials. Below are three methods of second generation E-Learning process.

**a. Live Broadcasting:**

It is similar to live television broadcasting. Unlike television broadcasting, E-Learning can be a two-way system that allows participants to take tests,
ask questions or respond to questionnaires. This capability is frequently used for seminars and other events.

b. **Video On Demand (VOD):**

This technology is being introduced via Cable Television (CATV) systems. Large number of learners can access video content, whenever they like. As with live broadcasting, it can function as two-way system.

c. **Interactive Communications:**

Interactive E-Learning systems take advantages of the two-way capabilities of the technology. There are two approaches Distance education approach and Community approach. With the distance education approach, the instructor can also interact with the learner – through text messaging systems or via audio and video communications. With the Community approach, the instructor becomes the focal point of virtual class and it is also possible to hold discussions with experts on specific themes.
Important features of E-Learning

1. Hyper text links:

   Hyper text links to sample relevant disciplinary websites may be helpful in giving students a sense of the disciplinary context for the course.

2. Personal Home Pages:

   Personal home pages can be used to foster the sense that the class is not just a collection of isolated individuals, but a community of learners who can profit from interacting with one another. Home pages encourage students to learn about each other so as to encourage contact and mutual interests. They help the learner to create a group of common interest.

3. Interactivity:

   This method of interactivity is e-mail. Having an online list of the e-mail addresses of all registered students, the professor and teaching assistants, who is possible with one mail subscription mechanism is included in online syllabus.
4. **Assignments:**

Some homework assignments for example; based on online materials can be directly linked to the class schedule. This helps the students to plan the preparation for the examination in a systematic way.

5. **Testing:**

Online drill or practice testing can be used to reinforce material even if the results are not used as part of a graded reading comprehension questions. For example: in short answer of multiple formats can provide students with an assessment of their level of understanding. This facilitates the students to measure their level of understanding and through continuous assessment they can try to improve their performance.

6. **Course Management:**

This helps to keep-up to-date records of students admitted for various courses.
7. **Content:**

The most difficult part of developing a web-based course is creating the online contents. It can be begin by transferring the basic lecture materials to the each and integrating media, such as sound, images and video. It is possible to experiment with some of the new web-based learning paradigms described above and finally rebuild the lecture, building its graph structure and use more (Hyper Text Markup Language) facilities.

**E-Learning success factors**

**Involvement of the top Management:**

Top management should set policies for the introduction of E-Learning. The policies should include clearly defined goals and specific way in which E-Learning can contribute towards the core business activities, and the types of human capital needed. Failure is likely if the only objective is to reduce training costs. The focus of human resource development is to develop human capital that matches with the companies’ philosophy and management strategies. It would be unthinkable to train people in ways that were not aligned with corporate strategies.
WEBSITE

A website is a collection of Web pages, images, videos or other digital assets that is hosted on one or more web servers, usually accessible via the Internet.

A web page is a document, typically written in Hyper Text Markup Language (HTML) that is almost accessible via Hyper Text Transfer Protocol (HTTP), a protocol that transfers information from the ‘Web Server’ to display in the users Web browser.

The pages of websites can usually be accessed from a common root Uniform Resource Locator (URL) called the home page, and usually reside on the same physical server. The URLs of the pages organizes them into a hierarchy, although the hyperlinks between them control how the reader perceives the overall structure and how the traffic flows between the different parts of the sites.

ELECTRONIC MAIL

Electronic mail often abbreviated to E-mail, email or simply mail, is a store and forward method of writing, sending, receiving and saving messages over
electronic communication system. The term ‘E-mail’ applies to the internet e-mail system based on the simple mail Transfer Protocol, to network systems based on other protocols and to various mainframe, minicomputers or intranet systems allowing users within one organization to send messages to each other in support of work group collaboration. Internet systems may be based on proprietary protocols supported by a particular systems vendor, or on the same protocols used on public networks. E-mail is often used to deliver bulk unsolicited messages or ‘spam’, but filter programs exist which can automatically block, quarantine or delete some or most of these depending on the situation.

Both plain text and Hyper text markup language (HTML) are used to convey E-mail. While text is certain to be read by all users without problems, there is a perception that HTML-based E-mail has a higher aesthetic value. Advantages of HTML are the ability to include inline links and images, set apart previous messages in block quotes, wrap naturally on any display, used emphasis such as underlines and italics and change font styles. HTML E-mail messages often include an automatically generated plain text copy as well for compatibility reasons. Disadvantages include the increased size of the e-mail privacy concerns about web hugs and that HTML e-mail can be vector for phishing attacks and the spread of malicious software.
Messages are exchanges between hosts using the simple mail Transfer Protocol with software programmes called mail transport agents. Users can download their messages from servers with standard protocols such as the POP, IMAP Protocols, or, as is more likely in a large corporate environment, with a proprietary protocol specific to Lotus Notes or Microsoft Exchange Server.

Mail can be stored either on the client, on the server side, or in both places. Standard formats for mail boxes include ‘Maildir’ and ‘inbox’. Several prominent E-mail clients use their own proprietary format and require conversion software to transfer E-mail between them.

When a message cannot be delivered, the recipient Mail Transporting Agent (MTA) must send a **bounce message** back to the sender, indicating the problem.

**VOICE CHAT**

Voice chat is modern form of communication used on the internet. The means of communicating with voice chat is through any of the messengers, mainly Yahoo Messenger or Windows Live Messenger. Voice chat has led to a significant increase in distant communications where two or more people from opposite ends of the world can talk almost free of cost.
VIRTUAL CLASSROOM

The word virtual can be understood as ‘being actively connected to a network or computer system; usually being able to interactively exchange, data, commands and information’. A virtual classroom is a learning environment that exists solely in the form of digital content that is stored, accessed and exchanged through networked computer and information systems.

Everything in a virtual classroom occurs in a non-physical environment; students access the classroom by connecting to the internet, rather than traveling to a real, physical classroom. The students may not even be in the same country as the instructor or teacher, the nature of virtual classroom means that, in terms of access, the geographic location of students is not an issue.

Although the term virtual classroom refers primarily to those learning spaces that exist completely independent of physical classrooms, they may also work in conjunction with traditional classroom environments. Some activities conducted in the real classroom can be presented differently in virtual spaces thus accommodating a wider range of student needs. In these settings the internet is used to provide additional communication and material, but does not necessarily replace the learning that occurs in the physical classroom.
Within the virtual classroom two main styles of learning are evident, these are collaborative learning and active learning. Collaborative learning is said to be more prominent and better suited to the nature of a virtual classroom. Virtual classroom defines collaborative learning as an environment in which “both teachers and learners are active participants in the learning process; knowledge is not something that is ‘delivered’ to students but rather something that emerges from active dialogue among those who seek to understand and apply concepts and techniques”. The virtual classroom demands this kind of learning in order to overcome the absence of face-to-face communication. In such an environment students and teachers work together to make learning a richer, more beneficial activity.

Independent learning differs from collaborative learning in that the student does not interact with other students. In such environments interaction takes place exclusively between the teacher and the student and learning is completely directed. In this case, the teacher is not the facilitator, but rather they are the provider of information. Students receive and respond to this information without collaboration and feedback from other students. Virtual classroom tends to encourage collaboration learning because more information and knowledge can be gained through the interaction and involvement with virtual class members than solely through the reception of information from an instructor.
VOICE MAIL

Voice mail is a centralized system of managing telephone messages for a large group of people.

In its simplest form, it mimics the functions of an answering machine, uses a standard telephone hand set for the used interface, and uses a centralized, computerized system rather than equipment at the individual telephone. Voice mail systems are much more sophisticated than answering machines in that they can:

- Answer any phones at the same time.
- Store incoming voice messages in personalized mail boxes associated with the user’s phone number.
- Enable users to forward received messages to another voice mail box.
- Send messages to one or more other user voice mail boxes.
- Add a voice introduction to a forwarded message.
- Store voice messages for future delivery.
- Make calls to a telephone or paging service to notify the user that a message has arrived in his mail box.
- Transfer callers to another phone number for personal assistance.
- Play different messages greeting to different callers.
Voice-mail messages are stored on hard disk drives, media generally used by computers to store other forms of data. Messages are recorded in digitized natural human voice similar to how music is stored on a compact disc. To retrieve messages, a user calls the system from any phone; logs on using touchtones (clearing security) and his messages can be retrieved immediately. Many users can retrieve a store messages at the same time on the voice mail system.

Many voice mail systems also offer an automated attendant facility. Automated attendants enable callers to a “main” business number to access directory service or self-route the call to various places such as a specific department, an extension number, or to an informational recording in a voice mail box etc.

VIDEO-MAIL

Video mail functions like a visual voice mail repository, allowing callers to leave video messages that can be subsequently retrieved by the recipient.

Video mail has the ability to send video clips along with e-mail messages. This is not the same as videoconferencing, which requires real time capabilities between sender and receiver, and it does require a high-speed connection.
A video mail host computer that serves up the videomail when you are ready to watch it. Previous versions were large uncompressed video files, slow to download, and often was nothing more than a choppy video attachment and was not very useful.

Today's streaming video mail is the new text e-mail with impact. Video mail has a big future, because it moves people, emotionally and visually, a video mail can communicate well and is personalized in nature. Because of the wide availability of broadband Internet connections video mail technology has started to take a bigger role in video communication on the Internet.

Video mail fills an important gap in the video communication segment because video mail providers or hosts may also provide senders of videomail with extensive reporting features adding a unique value to commercially driven marketing and sales applications. Also a look into video communication technology there are only two types of video communication, live and recorded, Videomail plays an important role in this segment by allowing all of the following features; prerecorded message, targeting of viewers, On or off control of video streaming and the viewer watches at their convenience.

As Internet users discover uses for videomail, Internet technology companies have begun offering both fee based and free videomail sending
services. This has helped consumers to begin using and experimenting with different services.

To send a videomail a user needs a video capture device usually a web cam and a computer with an Internet connection. A simple Search engine query will direct users to more than eighteen companies currently offering the videomail, video mail and video email service.

Videomail providers vary greatly in features, reliability, reporting, customization, video quality, video player types, templates and bulk mail capabilities.

The compression of videomail streams usually allow the viewer to watch over a wireless connection. This is another factor that is expected to foster growth of the industry.

E-Learning is an approach to facilitate and enhance learning through both computer and communications technology. E-Learning processes may be through asynchronous activities like e-mail, discussion forum etc. or through synchronous activities like choice sessions, video conferencing etc.