CHAPTER - 1

A PROSPECTIVE ON MODERNISING TRADITIONAL INSTRUCTOR LED INSTRUCTION WITH COMPUTER BASED INSTRUCTION

PRELIMINARIES

1.1 INTRODUCTION

Education in India has a rich and interesting history. It is believed that in the ancient days, education was imparted, orally by the sages and the scholars. The information was passed on, from one generation to another. After the development of vocabulary of languages, the education took the form of scripts, using palm leaves. Thus began the literature in writing which also helped in the spreading of the written literature. The temples and the community centres performed the role of the schools. The next advancement was the Gurukula system of education. The Gurukulams were the traditional Hindu residential schools of learning which was typically the teacher’s house. Even though the education was free, the students from, well-to-do families paid Gurudakshina which was a voluntary contribution after the completion of their studies.

At the Gurukulam, the teacher taught the subjects to the students on the various aspects of religion, scriptures, philosophy, literature, warfare, statecraft, medicine, astrology and history. This system is referred as the oldest and the most effective system of education[76,35].
1.1.1 Guru-shishya Relationship

This relationship is characterized by:

- The formal establishment of a teacher/student relationship.
- A formal recognition of this relationship, generally in a structured initiation ceremony wherein the guru accepts, and initiates the student as a shishya and also accepts the responsibility for the spiritual well-being and progress of the shishya.
- Sometimes, this initiation process will include the conveying of specific esoteric wisdom and (or) meditation techniques.
- Gurudakshina, where the shishya gave a gift to the guru, as a token of gratitude which was, often a monetary fee [76,35].

1.1.2 Role of Education in India

The British introduced education on a uniform basis throughout India. They introduced English education in India. Lord Macaulay’s Minutes of 1835 made them to introduce European learning in India through the medium of English. The new education introduced by British was not only secular in nature but also egalitarian in outlook. Educational opportunities were extended to all sections of the society including the so called untouchables. Liberal ideas, egalitarian values, democratic views, rational and scientific perspectives could spread through this education. The new education never remained the monopoly of the higher ups. There was no bar for the lower cadre also to avail all its benefits. The introduction and spread of the modern education helped the lower cadre also gain knowledge. Before the advent of British in India, the ancient education system was a domestic. In Punjab, the indigenous system of schools functioned. It was the domestic schools that imparted education. Persian schools were conducted by
Mohammedan Maulvis. The schools like Chatshalas imparted education to the mercantile and trading communities. In 1813, the East India Company laid a new foundation in India. The reforms in education were introduced during the governor-ship of Lord William Bentinck. He appointed Lord Macaulay, to go through and give a report on the system of education in India and it's reformation. Lord Macaulay replaced the ancient education system, with the British form and thus schools and colleges were started in their pattern. The schools were classified as Primary, Secondary and Higher Secondary. The Primary Schools taught the subjects only in vernacular language. The teachers were appointed for various subjects and the classes were taken by them. Earlier, the primary schools imparted education to the students using black slates and the teacher taught them by the use of a black board in common. The secondary and higher secondary schools improved it, to notebooks, paper and pencil. The teacher gave notes, on a particular subject. The questions were given to the students and they were asked to prepare the answers by referring to the books. Oral and written examinations were conducted by the teachers. Promotions to the next level, were made based on the marks secured by the students. The main purpose of the British regime was, to prepare the Indians as assistants to the government, like clerks and subordinate staff for the running of local administration. Under it, the medium of school education was in the vernacular language, while the higher education was imparted in English only. British government started giving funds to the indigenous schools which were in need of help and thus slowly some of the schools became government-aided [76,35].

1.1.3 Pedagogical Approach in Traditional Environment

Traditional face-to-face learning environment has been associated with the learning environment, wherein the teacher being the expert, imparts knowledge and is the sole assessor of students learning. Each lecture is
associated with self-contained and isolated curricular unit. Interaction is more between the teacher and the student. The content is generally sequenced in a linear order, from the teacher point of view and each student receives the same instruction at the same pace using the same context Dabbagh (1996). Instruction is therefore in the form of direct approach, where the teacher is teaching an "identifiable body of knowledge" to the students using, methods that are based on behavioral and early cognitive learning theory [22]. Hannafin, Hill & Land (1997); Kearsley (2000), Moore (1999) noted, that the learner is more dependent on the teacher for the guidance. The teacher is active while the student is passive [106].

1.2 CONSTRUCTIVIST ACTIVITY IN TRADITIONAL LEARNING

Traditional learning occurs in an environment, wherein the students are passive and the teachers take an active role, in verbalizing information to the students. Students learn the subject and record the related information in their notebooks. The information and the knowledge exchange are limited to real-life experiences.

![Class Room Environment](image)

**Figure-1.1: Traditional Learning Methodology Information & Knowledge Transfer**
Constructivism allows the students, to experience the learning and construct knowledge through the real-life problems. Instructional style promotes learning through personal experience. The interaction and collaboration came a few years later. The student-centred learning provides, the students with full opportunities to explore, discover and construct the knowledge which is relevant, applicable and useful for the real-life situations. Dalgarno (2001) stated that the students no longer had to receive the pre-packaged content from the teachers; instead they can actively take part and contribute to the construction of their own knowledge with real-world activities. Constructivism emphasizes the student-centred learning [67].

According to Gould (1996) and Jonassen (1991), the constructivist classroom learning focuses, on the ideas rather than the facts. The learning process involves the interaction between the students and the teachers. The focus is on the knowledge construction; dialogue and discourse. It promoted and encouraged knowledge in this complex world, where there are multiple representations of knowledge; diverse interest in learning; learning experiences and activities [5].

1.2.1 Student Learning Practices

The learning process is a constructive environment. It focuses more on the activities rather than the goals. The student’s experiences and their active participation, in the classroom activities are more important. Grabinger & Dunlap (1995) stated that the learning is not only a transmission of information, but also an analysis of information in the construction of knowledge [5].
1.2.2 Performance based assessment

Students are prepared and educated to demonstrate their knowledge, by the performance based on practices. The practice is, sharing and reflecting the ideas actively with their fellow students of, what they have learnt by recalling the information. That makes them enhance their learning skills progressively. Peer assessment is conducted in the middle and end of the term in a year. There are online participation and contribution to the online fora which lead, to the leadership responsibilities and team roles towards research. There must be multidisciplinary curriculum to the students. They can discover and exploit their potentials, to present their talents and opportunities. They can also take different subjects and courses of study.

1.3 INFORMATION TECHNOLOGY IN EDUCATION.

The development of radio broadcasting, made the people to adopt the communication technology, which provided major developments in the delivery of education. Research and Development on the teaching machines came up after the introduction of computers. There is a continuing research, development and implementation techniques, for the use of the information technology in various aspects of education which came to stay.

Information Technology is capable of, playing a major role for the delivery of resources in the field of education. The salient features are:

- Acts a delivery mechanism for existing forms of education.
- Responds to the new demands of traditional classroom education.

It was only the hardware components, which ruled the day. Later, the softwares were developed for creating applications in the field of education.
Networking of computers, gave rise to the Information Technology (IT). It is considered as a Scientific, Technological and Engineering advancement. The Management technique is the handling of the information and processing for the application of the computers, in the interaction with men and machines. It was with reference to social, economical and cultural matters. As stated by Margaret Riel and Kathleen Fulton (1998), the Computer Technology is an effective vehicle “in the transformation of classroom learning into learning communities along with teachers, students and community members, all playing a significant role in directing the course of education” [74]. It is used to cover a wide range of technologies used in collection, processing and transmission of information. Sansanwal (2000) defines IT as collection of hardware and software for the efficient management of information, i.e., storage, retrieval, processing, communication, diffusion and sharing of information for the social, economical and cultural upliftment [93].

Information Technology provides plenty of resources to enhance the teaching skills and learning ability. The information-based, teacher-directed learning provides a formal education system governed by directives. Now, the new type is an interactive learning technique which emphasizes the creation, application, analysis and synthesis of knowledge. Technology companies can no longer, rely solely on new graduates, as the primary source of new skill and knowledge. Countries need to respond to new needs, by creating education and training systems which equip people with the appropriate skills. Technology based learning environment, plays a pivotal role, in providing the learners with appropriate knowledge and skill which are required by the industry. In the open and distance education system, the technologies were used primarily to improve the effectiveness of teaching and learning, by individually tailored instruction and specialized variety of innovative programs, to large group of learners. Information Technology, led
to the development of Web portals of various educational institutions. They started uploading the information contents to their websites. Limited access to the chat and e-mail was made available. Information retrieval was limited. To overcome this barrier, an information super highway was developed. That is the Information and Communication Technology (ICT) which sends information, not only in textual form but also in various modes of delivery such as audio, video or any other medium which can be transmitted to the users.

1.4 NEED OF THE STUDY

E-learning has become a major component in the academic entity. The time has come to create a formalized set of guidelines which would ensure standards in development, offer, administration and utilization of such e-learning materials, across the world and the system is of effective usage to the society. If the process is not simplified and standardized now, these prevail a huge risk of this methodology becoming disarrayed and frivolous.

There are several recent changes that led to the rising need for e-learning in today’s globalized world:

- **Economy is evolving into a knowledge-based one:** In the last decade, the global economy has been shifting to what the so called “Knowledge-Based Economy” where knowledge is created, acquired, disseminated and utilized more efficiently and effectively by enterprises, organizations, individuals and communities for greater socioeconomic development and global competitiveness. The new knowledge economy puts a premium on intellectual capital, making lifelong education more important than ever. However, the constraints time, money etc are also becoming in number and complex in
nature. Accordingly, e-learning is a vital asset for all employees in the new knowledge economy, which eliminates the gaps of time, distance, resources etc., to a large extent.

✧ A paradigm shift in the way education is viewed and delivered:
At the dawn of new millennium, learning is increasingly viewed as a competitive weapon. Business success depends largely on high-quality employee performance, which in turn necessitates high-quality training. In the quest to remain competitive in today’s hyper-competitive market, companies are exploiting technology revolution in order to train more rapidly, efficiently and cost effectively.

✧ Exponential growth of the internet provides the ideal delivery vehicle for education:
Through its increasing reach and simplicity of use, the internet has paved the way for a global learning community to exist where language and geographic barriers to education have been erased.

✧ New Values: In olden days, corporate value and value creation were defined principally through material and financial assets. Nowadays a premium is put on intellectual capital. To retain their competitive edge, organizations have started to investigate new training techniques and delivery methods that enhance motivation, performance, collaboration, innovation and a commitment of life-long learning.

✧ New-technologies: The life of knowledge and human skills today is shorter than ever, mounting the pressure to remain up
to date with one’s education and training throughout a career. In the age of globalization and technological revolution, four-year degrees are just the beginning of a forty-year continuing education. Life-long learning is quickly becoming an imperative, in today’s world.

- **Competitive Edge:** Corporations view learning as a competitive weapon rather than a bothersome cost factor. Business success depends increasingly on top-quality employee performance, which in turn requires top quality training. Corporate executives now understand the developing employee skills is a key to creating a sustainable competitive lead.

- **Cost Effective:** In the run to remain competitive today’s in labour-tight market, companies are exploiting in advances in technology to train employees rapidly, effectively and at less expense.

- **Globalization:** As trade borders become less significant, global competition intensifies, international expansion has led to larger and more complex corporations. Today’s businesses have more locations in different countries and employ large number of workers with diverse backgrounds and educational levels.

- **Abundance of Information:** More information hast to be delivered in increasingly bigger organizations, testing internal planning, logistics and distribution. Corporations worldwide are now in search of more innovative and competent ways to deliver training to their geographically dispersed workforce [63].
1.5 SCOPE OF THE STUDY

The concept of the knowledge-based society is used, more in a political and policy-making context than in an academic one. The concept means, that the knowledge and information, are viewed as global public goods. They are tools to enrich the learning environment. It supports everyday experience and augments instructional resources. At the same time, people will acquire the telecommunications and information technology skills, which will prepare them to live and work in a knowledge-based society.

A knowledge-based society is an innovative and life-long learning society. It possesses a community of teachers, students, scholars, researchers, engineers, technicians, engaged in the research and manufacturers of high-technology goods.

For long-term social, economic development and job creation, there must be the skilled and informative-literate population. To build a knowledge-society and economy, the society must be endowed with the ability to generate, capture, access, absorb and share knowledge with the efficient use of information and communication technology.

Social, technological and economic drivers are transforming education around the world. With the globalization, the development of a skilled workforce becomes an international concern. As the human capital becomes the chief source of economic value, education and training, becomes the life-long endeavors, for the vast majority of the workers.

As we move towards a knowledge-based society, our understanding of education and knowledge development must undergo some transformation. e-learning is a consequence of this move towards more flexibility, choice and reach.
When a society becomes knowledge-based, it faces challenges on a variety of ways. How and why the knowledge is produced and shared, when it is produced, how the knowledge spills over and affects the new knowledge and how the public policy can and should adapt to all the crucial aspects?[96].

1.6 INFORMATION AND COMMUNICATION TECHNOLOGY.

The UNESCO World Education Report (1998) states that ICT and the new technologies which challenge the traditional methodologies of teaching and learning. Kouakou (2003) and Nwuke (2003) define ICT as combination of various technologies that enhances the creation, storage, processing, communication and dissemination of information [74].

The following are the technologies related to ICT:

1. Media Communication (Eg. Radio and Television)
2. Information Machines (Computers)
3. Communication Media, the fiber optic cables, phone and facsimile machine
4. Telecommunication infrastructure is the driving force for ICT wherein, the capability is to link various ICT elements together.

Information and Communication Technologies (ICT) provide an array of powerful tools. They help, in transforming the present isolated, teacher-centered and text-bound classrooms by the rich, student-focused and interactive knowledge environments. ICT encompasses all the forms of electronic communication in both digital and analog modes. The electronic devices include computers, compact disc players, mobile phones and satellite broadcasting. The analogue devices are the conventional radio broadcasting technology and the tape-recorders. Internet provides an enormous amount of
bandwidth. The volume of data that flows through a communication channel increases at an enormous rate. The potential use of computers has been identified as an efficient tool for obtaining the knowledge and information through the multimedia like CD-ROM and Internet. The global spread of the computers and the Internet has changed the way of communication between people and the developing social networks. Digital revolution has a significant impact on the educational system. The technology is a weapon of the educationists for solving the problems in education, like access to education, quality education and opportunities in the life-long learning. ICT has a potential to promote and increase the community involvement and can be used to teach about the technology itself. Information and Communication Technology (ICT) helps the people to acquire sufficient knowledge and skills and competencies for the future development of the education and learning [1].

Information and Communication Technology (ICT) should become a part of all the activities of the schools and colleges. Equal opportunities can be given to all the sections of the people. It is crucial, that the schools and colleges must change their basic educational methods, to bring out the student’s skills and knowledge towards the Information and Communication Technology (ICT). Students should acquire the constructive way of using ICT, for developing the projects, assignments and the other related activities. Students must be able to access, any information related to their subjects, at any point of time. ICT brings in, an enormous scope in the educational resources, thus facilitating the students to learn and the teachers to teach their subjects.

Information and Communication Technology has made an impression. A scope has been given for the educational system, in terms of curriculum, transactions, administration, infrastructure, connectivity, content
and management of educational institutions. ICT reduces the burden of the teachers, by keeping track of the attendance, assignment deadlines, homework and assessments. The thrust areas of ICT are as follows:

- Training of teachers
- Curriculum
- Infrastructure
- Resources
- Existing system adaptation
- Development of instructional and learning materials for online education and learning.
- Modes of evaluation
- Management strategies [97].

1.7 ICT AND INSTRUCTIONAL DESIGN (ID)

Learning theories have a significant impact on the instructional design, as there is a logical development from the learning to instruction. Instructional design optimizes learning outcomes, while learning theories are the backbone of any instructional design. Instructional design is the articulation or the manifestation of the learning theories, and its main aim is, to optimize the learning, by using the known theories of learning. Strain (1994) states that a wide divergence of views exists among the researchers in the instructional design. It is regarding the relative contribution of various schools, claiming that the instructional design has grown out of the systems approach, and its roots firmly placed in behaviourist’s psychology [34]. It has dominated instructional design. However, Hannafin and Reiber (1989) pointed out that the instructional design developed in the 1980’s by Gagne,
Merrill, Reigeluth & Scandura (2005) is largely due to the influence of cognitive theories of learning [40]. This emphasis is based on how the information is retrieved, selected, processed and perceived. More recent developments are due to the constructivist learning theories. There are three basic schools of theories of learning, namely Behaviourism, Cognitivism and Constructivism. These three schools of learning theories have common implications for instructional design. Behaviourism believes that the learning, results in changing the student’s behaviour. Cognitivism believes that the learning occur, when the students add, new concepts and ideas to their cognitive structure. Constructivism believes that the students construct knowledge for themselves. All the three schools follow the pattern of instructional design methodologies [33,41]

Behaviourism is the principle of reinforcement; retention and transfer of learning which are important for the consideration of a design. Statements of behavioural objectives, allow the learners to know specifically, when they have achieved their objectives. In this way, learners can monitor their own progress. The knowledge of objectives serves, as a reinforcing agent. The frequency of reinforcement is also a design issue. Retention of the information for the learners is also important for the instructional designer. Materials which provide more reinforcing activities help the retention of what has been learnt[20.100]

Cognitivism is the principle, that the learners first remember and then retrieve the information from the memory. Cognitivists emphasize the fact, that how the human mind works. They put a particular emphasis on the memory. The implication of this theory for the instructional designer is, that they could use the various techniques like chunking and mnemonics for the meaningful organization of the content. Thus teach the practice for storing and retrieving the information. Practice implies provision of the increased
opportunities to the learners, for the reward and reinforcement. Cognitive structures are created through practice, which leads to an efficient use of long-term memory. For example, instructional designers include, pictures used in video programmes, practice and exercise in the self-learning material, which offers opportunities for the practice. Practice is important for the learning and developing cognitive tasks.

Constructivism is promoting an open ended learning experience, where the methods and results of the learning are not easily measured. They are different for each learner. The implication of constructivism for the instructional designer is that the learners should attach themselves to the content domains. Constructivists believe that the learning occurs when it is contextual, problem based, social and authentic.

Media is used for information and motivational purposes. Briggs (1970) describes instructional media broadly as, all the means through which stimuli is presented, to provide the events of instruction [34]. Resier and Gagne (1983) describe instructional media, as a physical means by which an instructional message is communicated. An instructional medium is defined as a means of transmitting instruction, communication and instructional message which serves as a channel through which the content stimuli are presented to the learner, to provide the events of instruction [34]. Instructional Designers with relevant background in the field of Information and Communication Technology are normally responsible for developing a learning system. They must develop the quality content using Instructional Design Methodologies. These are the processes by which instruction is improved through the analysis of learning needs and systematic development of learning materials. Instructional designers often use technology and multimedia, as the tools to enhance instruction. It is an instructional act of
delivering the content to the students by introducing the sequence of instructions.

The six steps in developing content, using Instructional Design are:

1. Developing learning material based on students needs.
2. Defining learning outcomes.
3. Structuring the learning content.
4. Selecting the right material or the resource for a course.
5. Designing the learning activities.
6. Determining the modes of assessment [8]

1.8 ASPECTS OF INSTRUCTIONAL DESIGN

The instructional component is divided into four major categories:

1.8.1 Student Interface Medium: The concern is, to design the learner interface that includes the amount of information which can be shown at a time. The placement of different objects with various amount of information has to be synchronized on the screen, with proper guidelines.

1.8.2 Method of Navigation: The first aspect refers to the provisions to move around, within the resources provided. The second aspect refers to the navigation of information within the content.

1.8.3 Subject Matter: The subject matter can be produced in different modes by using the media. It can be categorized as text, static images/pictures, videos, simulations etc. They may be read or listened combination procedures [5].
1.8.4 Types of Pedagogical Approach: It is the science and art of
teaching. There are different types of pedagogical approach towards learning:

a. Case-Based Learning.
b. Inquiry-Based Learning.
c. Project-Based Learning.
d. Resource Based Learning.
e. Game-Based Learning.

1.9 EVOLUTION OF COMPUTER BASED TRAINING

The technology used in learning is replete with promises and
disappointments. “Film” was the first modern learning technology, which was
extensively used by United States military, in the Second World War. They
trained their recruits using the film for learning. The approach became
successful. After the war, extensive research was made in the use of the film
and later, the development of television as the learning medium.

Few years later, U.S. Military partnered the leading universities, to
bring about the benefits of behavioural and cognitive psychology towards
learning. Instructional films became the integral part of public schools
curriculum, for social and physical sciences. Television became an important
part for educators. It could purportedly bring, almost any form of learning into
the classroom. After a few successes and achievements, educational television
turned out to be a disappointing phenomenon.

The technology and content was highly expensive. Many schools
had not enough resources to support the education through the television.
From the pedagogical point of view, the teachers do not know how to develop
the television as an instructional medium. Poorly designed programs were
boring and the teachers do not know how to integrate them in the classroom. Television media had its drawbacks. It was not able to interact with the user, provide feedback and to customize presentation to meet the user needs. The interactivity phenomenon and efforts in the area of Computer Based Training (CBT) led to the teaching machines and programmed texts, thus paving the way for embryonic form of Computer Based Training (CBT). Then the Computer Based Training (CBT) really blossomed with a tremendous amount of investment, in the field and with the advent of Personal Computers (PC), which was a turning point. As more and more computers were installed in homes, offices, schools and colleges, they provided a growing base for the computers in which the courseware can be deployed. However a chronic lack of acceptable standards and affordable tools, made the job of the teacher difficult. Further there were many associated problems, related to the Computer Based Training and its viability towards educational technology.

1.10 COMPUTER BASED TRAINING / LEARNING IN INSTRUCTIONAL DESIGN PROCESS

Computer Based Training (CBT) uses computers for training and instruction. The courseware is developed by using, authoring tools which are designed to create a highly rich interactive multimedia content.

1.10.1 Pedagogical uses in Computer Based Training (CBT)

In the traditional Computer Based Training, an individual student is exposed to the material. At the end of the course, the student is tested by a series of questions. The system detects and corrects the student’s mistakes automatically. At the end of the course, the system does the auto-evaluation for each student.
Several models are available in the instructional design process, (Andrews & Goodson, 1980; Gustafson, 1981, 1991) for systematic production of instruction. Using Gustafson’s criterion for selection of appropriate model, known as product development model [34]. After carefully analyzing the components and the models for the design of computer based training, the models were built by Van Patten (1989), Bergman and Moore (1990). The suggested phases for the Computer Based Training/Instruction are given in Table-1.1.

**Table-1.1: Different Phases for Development of Computer Based Training**

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Content is developed by using instructional methodologies. The software is developed and installed in computers. The student has to enter the login and the password, to open the file. The interactive menu guides the
student for viewing and reading the various chapters of a course. The student can read the contents, any number of times by clicking the relevant button. The CBT may contain variety of applications such as text, animations, simulations and multiple choice questions [21].

**Advantages:**

1. The student can study at his/her convenience.
2. The student can learn at his/her own pace.
3. The student can repeat the material number of times.
4. The system will never become impatient with the student.

**Disadvantages**

1. Face to face interaction is not possible.
2. Limited communication skills for development.
3. Material production is extremely time-consuming and costly.
4. Software skills are required on the part of developers.
5. Lack of "Teamwork".

**1.11 OBJECTIVES**

India has a really high quality educational system, to disseminate knowledge at a time when the paper, printing, and other modern means of imparting education were neither known nor available. The innovation of classrooms, with relatively less number of students, was created along with the concept of standardized instruction for everyone. In a traditional teacher-centered environment, the teacher is the expert and the dispenser of knowledge to the students. It is largely a 'broadcast' model of learning where the teacher serves as the repository and transmitter of knowledge to the
students. The traditional view of learning process, is typically teacher-centered, with teachers doing most of the talking and doing intellectual work. The students are passive recipients of the information provided. This is not to indicate that the traditional lecture method is without value. It allows the teacher to quickly convey lots of information, to the students and is a useful strategy, for recall of learning. However, it is not the most effective way to help students, to develop and use higher order cognitive skills, to solve complex real world problems. Driscoll (1994) stated that, "learners can no longer be viewed as empty vessels waiting to be filled, but rather as active organisms seeking meaning."[21]. As stated by Don Tapscott (1998) "We are entering a new era of digital learning in which we are in the process of transitioning from ‘broadcast’ learning to ‘interactive learning’. Today, students no longer are passive recipients in the information transfer model of learning [21]. They have to be active participants in the learning process. There is a growing recognition, that today’s world requires the students to be able to work collaboratively with others. They think critically and creatively and reflect their own learning processes. As technology has created change in all aspects of society, it is also changing our expectations of what students must learn, in order to function in the new world economy. Students have to learn and to navigate through large amounts of information, to analyze and make decisions, and to master new knowledge domains, in an increasingly technological society. They need to be lifelong learners, collaborating with others in accomplishing complex tasks, and effectively using different systems, for representing and communicating knowledge to others. A shift from teacher-centered instruction to learner-centered instructions is needed, to enable the students to acquire the new knowledge and skills. Shifting the emphasis from teaching to learning which can create a more interactive and engaging learning environment for the teachers and the learners. This new environment, also involves a change in the roles of both the teachers and the students. The new views of the learning process are the shift to student-
centered learning, based on the cognitive learning research and the confluence of several theories. Thus it has increased our understanding of the nature and context of learning. The student-centered environment means, that the learner interacts with other peers, and the teacher, along with information resources, and technology. The learner engages in authentic tasks, authentic contexts using authentic tools and is assessed through authentic performance. The environment provides the learner with coaching and scaffolding, in developing knowledge and skills. It provides a rich collaborative environment enabling the learner to consider the diverse and multiple perspectives, to address the issues and solve the problems. It also provides opportunities for the student to reflect on his or her learning. Although the new learning environment can be created without the use of technology, it is clear, that ICTs can provide powerful tools to help learners access vast knowledge resources, collaborate with others, consult with experts, share knowledge and solve complex problems using cognitive tools. ICTs also provide learners with powerful new tools to represent their knowledge with text, images, graphics, and video. The latest view of the learning process is, based on the research, that has emerged from theoretical frameworks related to human learning. Many reflect a constructivism view of the learning process. In this view, learners are active agents who engage in their own knowledge- construction, thereby integrating new information into their mental structures. The learning process is seen as a process of "meaning-making" in socially, culturally, historically and politically situated contexts. A constructivist environment involves, developing learning communities, which comprises of students, teachers and experts who are engaged in authentic tasks in authentic contexts, a closely related work done in the real world. A constructivist learning environment also provides, opportunities of the learners to experience multiple perspectives by discussions or debates. The learners are able to see issues and the problems from different points of view. They can develop and share the knowledge with others. The constructivist learning
environment also emphasizes authentic assessment of learning, rather than the traditional paper/pencil test.

While considering the opportunities associated with ICT enhanced education, it can be said that ICT-enhanced education is better than a simple education but there are many challenges, which hamper the exploration and exploitation of its opportunities. In view of integrating ICTs in education, we have the following key challenges.

A. ICT Facilities.

The main challenge for ICT-enhanced education, is the availability of information and communication technology facility. Any ICT-based program is launched; policymakers and planners must ensure the availability of the following:

1. The infrastructure build the technology.
2. Computers with latest configuration.
3. Internet service for online learning

B. Linguistics

English is the expressive language of the Internet. A large portion of the educational software produced in the world is in English.

C. Training Teachers in ICT.

Lack of teachers equipped with ICT skills is another problem for the use of ICT in education. The institutes where ICT is going to be integrated in education, first of all, the teachers must be well trained about ICT tools in education. Before beginning to teach the students, the teachers must know, how and when to use ICT tools to achieve the particular objective.
D. Change Management.

Managing the changes is one of the biggest problems, as teachers do not accept the changes easily. Change management issues are, the new work practices, processing and performing the tasks. In general, a large number of teachers in the educational institutes are not ICT proficient and may be resisting to the change. Research has shown that the strategy of adding technology to the already existing activities in institutes and in the classroom, without changing habitual teaching practices, does not produce good results in the student learning. The reason for this is, due to the fact that the vast majority of teachers are not proficient users of latest technology, especially computer technology. A number of studies have shown that most of the teachers consider the two main obstacles, the one being, using latest technology in pedagogical practices and two, the lack of resources and training.

E. Leadership Qualities.

Integrating ICT in education is not an easy task. It requires a wide range of support including higher management and teachers. Therefore, it is necessary to properly convince them for their support and for this task, a leader is required. Leadership is necessary, before, during and after, the project implementation. Before the project is initiated, leadership is needed, in order to explain the model, the concept and create awareness of the project. Leadership is needed to manage the change and support the project.
1.12 ORGANIZATION OF THE THESIS.


Chapter-2 begins with the Introduction of the Online learning (Overcoming Limitations of Traditional Teaching and Learning), Web 2.0, Extensible support towards teaching and learning, Pedagogy 2.0 – Teaching and Learning for the Knowledge Age, Social Interaction, Learner Choice, Control and Principles underlying in Pedagogy 2.0.

Chapter 3 gives the description about the detailed processes adopted in developing an intranet learning system known as “KnowledgeNET”. However, for practical purpose, it is proposed to indicate the detailed process for a particular course in the Computer Applications department that could acts as a supplement to traditional teaching and learning methods.

Chapter 4 gives a research study, about the proposed model of Agent based e-education & course authoring system and packaging, using scorm. The purpose of this model is that the content can be reused, organized and enhanced to scorm content. It can be used in different operating systems and environments. It can be used in libraries as learning objects which can be assembled at any point of time, based on the student’s feedback using agent
methodologies. We propose a Methodology of ABECASPSSE (Agent Based E-Education and Course Authoring and Packaging Using SCORM for Student Environment) based On Java Agent Development Framework (JADE) which is a software framework, fully implemented in Java language. It simplifies the deployment of multi-agent systems and technology, through a middleware that comply with FIPA specifications and through a set of tools that support the debugging and deployment phases. Education Object (EO) will shorten the lead time cycle in developing the course in order to deploy conveniently in a system. This will be found easier by Education Object (EO) and course designers.

Chapter 5 concludes the thesis and discusses scope for future research work.