CHAPTER I
INTRODUCTION

1.0 Introduction

The 21st century is the century of science and technology. It is, therefore, impossible to live without the influence of science and technology in the contemporary world. The structural change in scientific and technological advancement of a country should therefore become the main focus point. Education in general and higher education in particular will have to play key role in the promotion and development of human resources, which are required to take any nation forward.

Man has always desired for excellence. This desire has given birth to new inventions and innovations in all walks of life. Science and technology has always been instrumental in bringing efficiency and improvement in the processes and products of the human work. The world of education has also been influenced by the increased use of technology. It has provided valuable help in improving the task of the teacher, smoothening the process of teaching-learning and enriching the goals of education.
1.1 Education and Technology

Education is the process of bringing desirable change in to the behavior of human beings. It can also be defined as the process of imparting or acquiring knowledge and habits through instruction or study. When learning is progressing towards goals that have been established in accordance with a philosophy, which has been defined for, and is understood by the learner, it is called 'Education'. If education is to be effective it should result in changes in all the behavioral components (Bhatnagar, 2002).

Eric Ashby (1967) has identified four revolutions in education: The first revolution occurred when societies began to differentiate adult roles and the task of educating the young was shifted, in part, from parents to teachers and from home to school. The second was "the adoption of the written word as a tool of education". Prior to that time, oral instruction prevailed and it was with reluctance that "writing was permitted to coexist with the spoken word in the classroom". The third revolution comes with the invention of printing and the subsequent wide availability of books. The fourth revolution is the development in electronics, notably those involving the radio, television, tape recorder and computer.
History of the use of technology in education takes us to the stage when the subject matter became available in the form of printing material and textbooks. It was soon supplemented by the use of teaching aids like blackboard, specimen, pictures, charts, models, maps and figures, etc. In this way, the earlier concept of educational technology was limited to the use of simple audio-visual aid meant for direct teaching-learning.

1.2 Meaning of Educational Technology

Ongoing efforts to define educational technology originate with the definition committee created by the Association of Educational Communications and Technology (AECT) (originally the Department of Audio-Visual Instruction). One popular conception of educational technology is linked to the maturation of the audio-visual movement in education and instructional training programs beginning in the First World War with developments arising out of master learning and programmed instruction trends in the fifty's spearheaded by individuals like B.F. Skinner, and James Finn (Morgan, 1978; Reiser, 1987). Early definitions of Educational Technology are definitions of audiovisual communication. Ely (1963) states, “Audiovisual communication is that branch of educational theory and practice primarily concerned with the design and use of messages, which
control the learning process.” Common to these conceptions is the view of educational technology as synonymous with audiovisual communication and instruction.

The emphasis on instruction is more accentuated in more recent definitions offered by AECT, which employs the term ‘instructional technology’ instead of ‘educational technology’. Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (AECT 1994). Educational technology scholars and practitioners contributing to the field over the past four decades realize that formally defining educational technology is challenging for a number of reasons. First, defining an applied field like educational technology is more difficult than defining any of the social science disciplines. The reason is that there is no single knowledge base to ground educational technology, as is the case in the social sciences. In an applied field, by its very nature, multiple knowledge bases are employed. The development of new knowledge causes shifts in thinking and introduces change and in the field of educational technology multiple knowledge bases lead to multiplying change. This compounds the challenge of creating a viable definition. Second, defining educational technology as a process also creates dissonance between the popular notion of technology as state-of-
the-art equipment and the older idea of technology as a process. This dissonance surrounding technology gives rise to definitions that are not easily understood within the field or widely embraced outside of the field of educational technology. What is revealed from exploring educational technology from the “inside” is that educational technology is an applied and decision-oriented field developing from multiple sources identified by accrued literatures produced in the field. This complicates efforts to define educational technology and demands a broad and multi-faceted approach to defining educational technology capable of clearly delineating underlying governing principles, multiple roles, and multiple knowledge bases associated with the field.

A systems definition of educational technology in society addresses theoretical grounding concerns (view from outside) and accommodates multiple uses and governing principles expressed in the field (view from inside). Drawing together key themes identified in the discussion (view from outside), criteria for conceptualizing technology in the field of educational technology revolves around concerns with mental processes and products to serve human purposes embedded in socio-environmental contexts. These criteria are key components to a definition of educational technology for society. The above discussions suggests a systems definition of educational technology as goal
An oriented problem-solving systems approach utilizing tools, techniques, theories, and methods from multiple knowledge domains, to: (1) design, develop, and evaluate, human and mechanical resources efficiently and effectively in order to facilitate and leverage all aspects of learning, and (2) guide change agency and transformation of educational systems and practices in order to contribute to influencing change in society.

Different educationists have defined educational technology in different ways. Some of the predominant definitions are as follows:

Educational Technology is a systematic way of designing, implementing and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non-human resources to bring about more effective instruction (Kumar, 2001).

The Association for Educational Communications and Technology (1994) has identified the five domains of [educational technology as: design, development, utilization, evaluation and management (Venkataiah, 1996).

Educational technology is the systematic application of scientific knowledge about teaching-learning and conditions of

Educational technology is concerned with the application of modern skills and techniques to requirements of education and training. This includes the facilitation of learning by manipulation of media and methods, and the control of environment in so far as this reflects on learning (Unwin, D; 1969).

On analyzing the concept of educational technology one identifies that educational technology is a multifaceted concept. This has led to view it in terms of some specific types or approaches. Accordingly Lumsdeine, (1964) has classified educational technology in three distinct types or approaches as below:

- Educational Technology I or Hardware Approach.
- Educational Technology II or Software Approach.
- Educational Technology III or Systems Approach.

1.2.1 Educational Technology I or Hardware Approach

This type of educational technology has its origin in physical sciences and engineering and is based on the concept of service that is, using technology in education (Silverman, 1968). While teaching in a big hall, a teacher uses microphone for making his
voice audible, he may be said to approach such type of educational technology for making his teaching effective. In this sense, audio-visual aids like charts, models, slides, film-strips, audio cassettes and sophisticated equipments and gadgets like radio, television, films, projectors, tape-recorder, record-player, video, teaching machines and computers, etc. all may mean to user the technological advancement in the world of communication for educational purposes, such type of mechanical and technical revolution has almost mechanized the teaching-learning process. The mass media movement born out of this approach is now contributing a lot to reach the educational benefit to masses with great ease and economy and in this way hardware approach to education has resulted in improving the efficiency of educational means and reducing the cost of education. However, this type of technology or approach tries to enter education from outside, operating more in isolation than in combination. Almost all the material and equipments of this hardware approach originally belong to the area other than education and are being borrowed and utilized for educational purposes.
1.2.2 *Educational Technology II or Software Approach*

Where the first type of educational technology (hardware approach) is originated from the physical science and applied engineering, the second type of educational technology (software approach) owes its origin to the behavioral sciences and their applied aspects concerning psychology of learning. Psychology of learning provides solid technology for bringing desirable behavioral changes in the pupils and thus serves the cause of education by laying down definite instructional procedure, teaching behavior and behavior modification devices, it is in this sense that this second type of educational technology is sometimes referred to as instructional technology, teaching technology or behavior technology.

Originated from the theories of learning this type of technology tries to adopt a process-oriented technique for the production of suitable teaching-learning material, teaching-learning strategies, evaluation techniques etc, for optimum results in the process of teaching and learning. Thus, in this type and approach educational technology is basically the technique of developing and utilizing software and that is why it is referred to as software approach.
In such sense the materials like programmed material, teaching-learning strategies based on psychology of learning are usually known as software and the equipments and gadgets are called hardware. In the other way, whereas, in hardware approach we are more concerned with the production and utilization of audio-visual aid material and sophisticated instruments and gadgets and mass media for helping the teacher and learner to achieve better results, in software we try to exploit psychology of learning for the production and utilization of software techniques and material in terms of learning material, teaching-learning strategies, tools of evaluation and other devices to soften and smoothening the task of teaching and learning.

1.2.3 Educational Technology III or Systems Approach

This third type of educational technology is related with the concept of systems engineering which owes its origin to computer science. It represents the latest concept in technology of education. In this type and approach, educational technology stands for a systematic way to design, carry out and evaluate the total process of education in terms of specific objectives. Thus, it means a systems approach to organize educational system effectively and economically, keeping in view the educational objectives and available man-material resources.
This system approach takes education as a system having a set of inputs, which are subjected to a process designed to produce certain system. The application of this type of educational technology or system of education as a whole and views it in the context of the specified objectives and functioning of its inter-related parts and the whole system under the existing constraints. If the system meets the requirements of the system objectives, it is maintained. If it does not fulfill the specified objectives, it is modified. As a result various alternative strategies and tactics are explored, designed and implemented and the most appropriate and feasible one is retained.

In this way, in systems approach one has to make a continuous comparison of the different roles played by man, machine and media in a system of education and develop an appropriate instructional design and strategy in relation to the stipulated objectives. This type of educational technology or systems approach is quite a new concept in the field of educational technology.

In looking to the future of educational technology, much of the key theoretical work required to ground the field depends on the excavation of historical/theoretical texts applied to new areas of development. The reason for this is that defining something as
complex as a field, even a relatively young field, requires an understanding of where the field has been in order to gauge its current state and make intelligent predictions concerning its future. The excavation of historical/theoretical texts, both from outside and inside the field, applied to new areas of development is one area where a systems definition of Educational Technology contributes significantly.

1.3 Importance of Educational Technology

Many educationalists have highlighted the importance of educational technology in the process of teaching and learning in their articles. A few such writings are briefly presented here to understand the importance of educational technology in all levels of education. Cyganski, David, (2007) remarked that technology is the human innovation that involves the generation of knowledge and processes to develop systems capable of solving problems and extending human capabilities. Technology is concerned with the advancement of science, design, development, installation, and implementation of information systems and applications. Technology may be referred as a science used practical purposes. Technology comprises specific information and knowledge that can be in physical form, such as models, drawings, sketches, diagrams, blueprints, manuals, or in
non-physical form, such as training or technical services. It comprises mechanisms for distributing messages, including postal systems, radio, and television broadcasting companies, telephone, satellite, and computer networks. Technology helps us to save time and energy by providing convenience at work. Technology is used in the production of goods and services that is considered useful in areas like computers, medicines, and machines. Some examples of technology are the electronic media such as video, computers, compact discs, lasers, audiotape, cell phones, and satellite equipment that are used as tools to create, learn, explain, document, analyze, communicate or present artistic work or information. From household activities to organizational activities, technology has been widely used as a part of our day-to-day lives. The reason that technology is becoming popular is due to the multi-faceted advantages that it provides.

According to Amjad Ali (2004), the educational media can be defined as various media components, which are used for the purpose of education. A clear distinction and generally accepted definition has not been developed as yet though efforts have been made to define the same in own style. The very purpose of educational technology is to facilitate and improve the quality of human learning. In order to solve various problems of education,
technology consisting of various media of mass communication and modern testing and evaluation techniques are essential. Specially, in developing countries like India and Iran, it has to be mastered and utilized by the educational administrators if they have to keep pace with each other and catch up with the developed nations. The following are the reasons for application of media in education:

Print media is easy to carry and it can be used according to the convenience of students. Newspapers are specifically useful for maintaining contact between scattered people. In the broadcast media, radio has enormous potential it can cover very large audience and can reach isolated spots. Radio is within the reach of masses and should be used as a home based means of imparting education. It supports to correspondence students by way of classroom materials and information services of various kinds.

TV makes it possible to use broadcasting for visual presentation. TV broadcasting is an important component in the distance education and gives the individual strength in encouraging representations by individual learners. Recently a channel of Doordarshan has been dedicated for imparting instruction to the distant learners.
Audio and video cassettes are the media which would be crucial for distance education. Through the teleconferencing, the counseling sessions are arranged for students to bring the factor of two-way interaction. Telephone teaching can provide two-way interaction between learners and teachers. Videodisks can be linked to the computers and the learners can interact with the material at their own place and choice. The most convenient means at least in principle of getting textual information to member institutions is by fax.

Multimedia like audio, videocassettes, telephone teaching, radio broadcast, computer learning material etc. are used at home or at the educational institutions in various parts of the country to have a face to face contact with educators to clear doubts. All these media are educationally sound and reach to the masses at a greater extent.

M.H. Siddiqui, (2004) has reported that educational technology offers the opportunity to change the roles that teachers and students have traditionally played. The level of effectiveness of educational technology is influenced by the specific student population, the software design, the teacher's role, how the students are grouped, and the level of student access to the technology. With technology dispensing
information, teachers are free to coach and facilitate students learning. With technology monitoring learning, students can become active learners, working to effectively acquire new skills as they solve problems. If the goal of creating high-performance learning organizations is to be realized, the re-invention of education has to incorporate these new tools. Technology is critical to preparing students to live, learn, and work successfully in a digital age.

Lesisko (2004) also feel strongly about helping educators to utilize technology in their classroom/laboratory and are interested in developing innovative ways to encourage the use of technology resources. Since providing technical support services for the district was the highest ranked item this may suggest that technology leaders are concerned with providing adequate support services.

The use of technology is different from the effective use of technology. For example, regarding the use of PowerPoint, Young (2004) stated ‘some professors simply dump their notes into a PowerPoint presentation and then read them, which can make the delivery even flatter than it would be if the professor did not use slides’. Regarding the use of web in teaching and learning, Oliver (2001) described three types of uses: quick dissemination of
course information, web enabled supplements, and web engaged activities. Information dissemination refers to the online delivery of course information to students at anytime and anyplace. Web enabled supplements provide students with access to course related materials they would otherwise not have the opportunity to study. Web engaged activities provide students with information processing tools and promote higher order thinking. Studies have found that information dissemination uses of course web pages were far more common than web enabled supplements or interactive activities (Dehoney and Reeves, 1999). While the limited number of available supplementary materials and web engaged activities might be one reason for this, an important reason comes from an instructor's concept of teaching. Based on a meta-analysis of thirteen studies of university instructors' conceptions of teaching, Kember (1997) defined five conceptions on a continuum from teacher centered to student centered: imparting information, transmitting structured knowledge, student-teacher interaction, facilitating understanding, and conceptual change/intellectual development. An instructor's concept of teaching greatly influences his or her use of technology. However, most university instructors generally do not have an educational background. They do not know how to use
technology with pedagogical effectiveness (Zhou, Brouwer, Nocente and Martin, 2005).

1.4 Educational Technology in Higher Education

In the 21st century, knowledge will be the key, and the fundamental sources of wealth will be knowledge and information rather than raw materials and labour. Measuring of the economic value of knowledge is still a complex job and a big challenge. But some works have been done. Information may be treated as a fundamental unit of nature. Tomorrow the industry will be a knowledge industry where knowledge workers may be quite expansive but the most expendable of all. The mantra of getting a competitive edge in the age of liberalization and globalization is ‘Lead or Follow’. Those who want to be followers shall continue to remain so year after year. This is because of the simple law of competition that a follower or a borrower country can never get front running technology from the country of export, what they at best can expect is nothing but near obsolete technology and systems. Therefore, going for ‘lead’ is the best mantra of the present days’ competitive advantages.

Hence, Teaching and learning in higher education contexts occur differently today from how they did as recently as a decade ago. Widespread social, economic and technological change is
transforming the student populations, the curricula and the learning cultures of university classrooms (Dennis & LaMay, 1993; Kershaw & Safford, 1998; Privateer, 1999). Employment and productivity in the present Information Age are based not so much on the ownership of natural resources and the harnessing of energy in heavy industry, but on the informational “flows” of organizations within global networks (Castells, 1999). In the postindustrial economies of most western nation-states, the primary forms of productive labour and of maintaining a competitive edge in the market are information processing and the generation of knowledge.

Digital technologies have played a major role in these societal changes and in the transformation of higher education. Technological convergence and global media networks offer educators a range of online services and products that are well suited to classroom use (McCann, 1998).

Information Technology (IT) in teaching and learning is not a new activity; it started out as computer-assisted learning (CAL) which became a significant minority activity in the 1960s. At that time the underlying educational philosophy was based on behaviorist models designed to generate programmed learning. This was the era of mainframe computing and the usage was
largely initiated by military training applications, with some academic research backed by central budgets. How to create and develop IT resources for teaching and learning is beyond its scope to consider how to create pages for the World Wide Web (www), write apiece of tutorial courseware, or set up a moderated discussion list or video-conference. Creation of resources had become a little less difficult, but it still required technical specialists to produce materials. By the 1980s, applications were broadening out in range and variety, a change, which again reflected the underlying change in technology away from centralized mainframe computers; 1981 was the year in which the personal computer was launched. The ways in which applications could be created were becoming more accessible to non-specialists, through the authoring languages. However, the creation and use of computer-based materials in learning and teaching was still restricted to a small specialist group of enthusiastic academics. An important aspect of effective use and integration of technology is the way in which it effectively reflects and articulates a given learning model. At the same time as technology has moved forward, the dominant model of learning have changed from behaviorist, through objectivist, to constructivist, in the constructivist model the learner, in acts of understanding, constructs knowledge. The approach taken in this
chapter is to view the role of IT in teaching as providing an additional learning resource that must be integrated into the total learning experience, in the same way that lectures, fieldwork or course notes are all learning resources.

It is possible to use IT in teaching and learning in a whole range of ways:

- Accessing electronic journals;
- Computer-generated presentations to accompany lectures;
- Electronic publication of lecture notes;
- Research using the web or CD-ROM;
- Running electronic discussion groups with your learners;
- Setting computer-based bibliographic searches;
- Setting worked examples making use of tools such as spreadsheets or databases;
- Using computer-based learning programmes;
- Using e-mail communications for class management;
- Using real current databases to retrieve information;
- Video conferencing with other students overseas; and
• Word-processed lecture notes.

So also Information Technology is very much useful for:

• Sharing of resources;

• Professional development of teachers;

• Research;

• Gaining total quality management;

• Open and Distance education (Usha Rao 2006).

1.5 Multimedia Approach to Teaching-Learning Process

Educational technology is a relatively new field, which aims at improving the teaching and learning. Hardware and software are two structural components of this technology and multimedia is an important aspect related to them. Education as a system has some objective planned for the process, for the realization of which a variety of strategies, techniques and aids have been designed and devised by educational technologists.

Multimedia approach is one such innovation that is aimed at improving the teaching-learning process. It has been proved by research that multimedia in schools and universities are effective for students to learn both "from" and "with" it. The focus is now on media and technology because of their advantages in terms of
repeatability, transportability and equity of access. Multimedia helps students to construct knowledge actively, work in groups and use multi-senses at a time. That media is power is a well recognized fact. However different media have different potentials. We cannot be rest assured that only one media is suitable for a set of objectives. A judicious mix of media, multimedia helps in removing the limitations of each and cascading the advantages of all.

Current recognition of the term multimedia refers to systems that support the use of text/numbers, audio, still images, animations, video and graphics." the integration of two or more of: audio (speech/music), still images, video, text/numbers, graphics & animations to a coherent, manageable mix at the user interface" (for example a combination of text, graphics and audio-visual material available on a CD-ROM or via the World Wide Web) (Wallis, 1995).

In the area of instruction, the use of more than one medium is of course not new. For generation, good teachers have been using a variety of media in the classroom. But today we speak of multi media systems, and this is a concept significantly different from what we have done in the past. A system of instructional materials begins with a specific set of objectives and
is then designed from the ground up to achieve those objectives most effectively. Each component of the system is developed in order to accomplish a specific purpose through the best medium available. Finally, all components and media are integrated to reinforce each other in a fashion that will produce the non-Euclidean ideal of a whole greater than the sum of its parts. The rationale behind the multimedia system is straightforward. Although we have long recognized that we learn through multi sensory experiences to enable each learner to find his own way to knowing and understanding what we want him to learn (Brown, 1969).

1.6 Need and Significance of the Study

The present higher education system all around the world exploits the potentials of education technology for better delivery and reach to the un-reached. The utilisation of the education technology varies from formal to non-formal education and from distance to continuing education. The various media like radio, TV, computer etc., have been extensively used now-away days to supplement and complement the formal education at the higher education. In addition to this, most of the Open and Distance Education (ODE) institutions all over the world are fully depended
on the education technology for the course delivery at the higher education level.

There has been little research in the area of how the formal students at the higher education are utilising the educational technology facilities available in the institutions or within their reach. Many of the reviewed research studies focussed on the effectiveness of various educational technology gadgets such as computers, televisions, radio, multi-media, and the Internet on teaching-learning process (Dharakar, 1992; Jaiswal, 1992; Kiazie, Struss, and Foss, 1993; Mitchell and Fox, 2001; Dawson and Rakes, 2003; and Alghazo, 2006).

Thousands of students pursue for higher education degrees every year. Most of the students attend for their regular classroom teaching and it has been noticed that little attention has been given for enhancement of the learning opportunities through many of the education technology facilities available to the students with in their reach.

As the information revolution emerges to alter economical, social, and cultural arenas, the impact of technological growth has begun to play a major role in determining the overall effectiveness of efforts to enhance the education of students both in Iran and India particularly at the higher education. Thus an
attempt has been made to study the available educational technology resources in the Postgraduate Departments of the Universities in India and Iran. The present study was aimed at filling the existing research gap and through light on the status of utilisation of educational technology at higher education.

Thus, the problem selected for the study is stated as to study the availability and accessibility of educational technology facilities in the post graduate departments and the utility of educational technology facilities by the postgraduate students in Indian and Iranian Universities.

1.7 Title of Study

“A Critical Study of the Availability, Accessibility and Utilisation of Educational Technology Facilities for the Postgraduate Students in Indian and Iranian Universities”

1.8 Operational Definitions

Educational Technology

In this study, ‘educational technology’ is referred to all those tools/ aids that are normally used to improve the process of students learning at the higher education. It includes the hardwares and softwares developed /available for teaching-learning.
Postgraduate Students

Students who are pursuing the higher education for their master level degree courses.

1.9 Objectives of the Study

The following objectives have been stated for the study:

- To compare the development of educational technology for Higher Education in Iran and India.
- To evolve a benchmark for use of educational technology by postgraduate university students for higher learning.
- To compare the postgraduate students availability and access to educational technology facilities in Iran and India.
- To assess the level of educational technology skills of the postgraduate students in Iran and India.
- To study the attitude of the postgraduate students towards use of educational technology for higher learning in Iran and India.
- To compare the postgraduate students extent of utilisation of educational technology for higher learning in Iran and India.
• To establish the relationship between the attitude towards use of educational technology and utilisation of educational technology by the postgraduate students in Iran and India.

• To study the relationship between the extent of utilisation of educational technology and academic performance of postgraduate students in Iran and India.

1.10 Research Questions

• Is there any difference in the status of development of Educational Technology for higher education in Iran and India?

• What could be the standard for use of Educational Technology for higher learning by Postgraduate University Student?

• Is there any difference in the availability and access to Educational Technology facilities in Iran and India?

• What is the status of Postgraduate Students with respect to their Educational Technology skills in Iran and India?

• Is there any difference in the attitude towards use of educational technology between Postgraduate Students in Iran and India?
• Is there any difference in the extent of utilisation of Educational Technology by Postgraduate Students of Iran and India?

• Is there any relationship between Postgraduate Students attitude towards use of Educational Technology and Utilisation of Educational Technology?

• Is there any relationship between the extent of utilisation of educational technology and the academic performance of Postgraduate students?

1.11 Delimitations of the Study

The delimitations of the study are as follows:

• The sample of postgraduate students is drawn only from the ten-selected departments of University of Mysore in India and ten-selected departments of Ferdowsi University in Iran.

• Generalisation of the findings of present study is limited only to the selected Universities in both the countries.