INFLUENCING FACTORS OF E-LEARNING ADOPTION AND ITS EFFECTIVENESS- A STUDY OF INDIAN IT INDUSTRY

Doctoral thesis submitted to University of Hyderabad
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DOCTOR OF PHILOSOPHY
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By

PADMAJA PALANATI
Regd. No. 10MBPH12

Under the Supervision of

PROF. V. SITA

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
PROF. C. R. RAO ROAD
HYDERABAD 500 046

June, 2015

DECLARATION

I, Palnati Padmaja, hereby declare that the research embodied in the present thesis title **"Influencing factors of e-learning adoption and its effectiveness- A study of Indian IT Industry"** is a bonafide work for the full period prescribed under Ph.D ordinances of the university.

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Research Supervisor & Dean

(Dr. V. SITA)

Dedicated to

My Children

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Padmaja Palnati

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KEY ABBREVIATIONS

S.NO	Abbreviations	Full Form
1	LMS	Learning Management System
2	LCMS	Learning Content Management System
3	M-Learning	Mobile Learning
4	JIT	Just in Time
5	IT	Information Technology
6	BFSI	Banking Finance Services and Insurance
7	CBT	Computer Based Training
8	IDC	International Data Corporation
9	WBT	Web Based Training
10	EPSS	Electronic Performance Support System
11	EET	Electronic Enabled Training
12	EETS	Electronic Enabled Training System
13	SPSS	Statistical Package for Social Sciences
14	ANOVA	Analysis of Variance

CHAPTER I
INTRODUCTION

CHAPTER- 1

INTRODUCTION

1.1 Background of the Study

Tectonic shifts in business demands in a technologically advancing environment have stimulated organizations to find ideal workforce which is attitudinally positive, technologically competent, that has a willingness to learn and capable to deliver results. It is human resources of the organization which determine its potential and can contribute to the success of Business. This Chapter introduces the background of the study, advent of talent and knowledge economy, growing importance of training for the workforce, development of e-learning as a training medium and the deployment of e-learning in IT industry for training its workforce. The chapter also presents an overview of IT Industry in India, challenges that it faces and a brief description about the pertinent variables which are used in the current research study.

1.1.1 Human Resource Management

Human Resource Management (HRM) is a concept which denotes the manner in which organizations manage the most valuable assets of organization- *the people* who align themselves in line with business objectives and work individually or collectively to achieve them. Organizations' main challenge has always been to get the work force to execute effectively and increase productivity. To meet the current job demands that exist in an organization and to groom the workforce for futuristic demands at work, the framework of *Human Resource Development*(HRD) has been developed. Significance attributed to employee growth at work has a history that can be traced back to humanistic movements in organizational studies (e.g., Alderfer 1972, Argyris 1964,Herzberg 1966, Likert 1967, McGregor 1960). Psychological research also suggests that employees consider growth as priority (Schwartz 1992, Sheldon et al. 2001)and will seek out contexts and activities that facilitate their growth (e.g., Deci and Ryan 1985, Helson and Srivastava 2001).Thus, the core of Human Resource development focuses on developing personal and organizational skills of people at work and improve their competencies. Concepts like human capital management have been introduced as a concept to employee staffing that considers people

as assets (human capital) whose existing value can be measured and whose future value can be improved through investment.

Organizations have come to concentrate on not just developing the knowledge and abilities of human capital as a whole but individual's talent too. Talent management has shaped up as a process to use formal, structured and informal, unplanned learning in order to acquire and retain competitive advantage for the organization. The process involves recruiting, retaining, developing, rewarding and turning the workforce productive to achieve specific business goals. McKinsey's research in 1997 and *War for talent* have emphasized the significance of talent of human capital.

1.1.2 Advent of Talent Economy and Knowledge Economy

Organizations today are increasingly driven by talent. Talent economy is creating a completely different workplace, where learning is given a lot of importance. "To be successful in knowledge economy, firms need to create learning organizations", Tapscott, 2009

"In today's knowledge driven economy, the most successful companies understand that sustainable advantage comes not from technology or having the right product, but from leveraging the most important asset any company has – the talent of its employees" as stated by Kristina Stiffler (2006) . Thekey to success of any organization in today's competitive business world seems to be recruiting right talent, grooming talent and retaining them. Nurturing talent in an organization is one of the most effective ways to transform its performance once properly planned with effective training interventions.

Knowledge pertaining to any domain is evolving so quickly that it has become increasingly important for the knowledge workers to upgrade their skills and talent while on job. "X-Generations demand X-cellent training in an X-celerated speed." says Angel Rampy an executive coach, 2010. In its 14th Annual Global CEO Survey, Price Water Coopers found that retaining some of their best people figured as the most challenging aspect faced by business leaders across the globe. Long term commitment can be obtained by knowing employee's career ambitions and helping them to develop skills and competencies they need for future prospects. Hence training, learning and development have turned out to be significant in knowledge economy.

According to Organization for economic cooperation and development (1996) “the growing codification of knowledge and its transmission through communications and computer networks has led to the emerging information society”. According to Forbes (April, 2014): Employee capabilities have become a priority, amount spent on corporate training soars. US spending on corporate training grew by 15% last year (the highest growth rate in seven years) to over $70 Billion in the US and over $130 Billion worldwide.

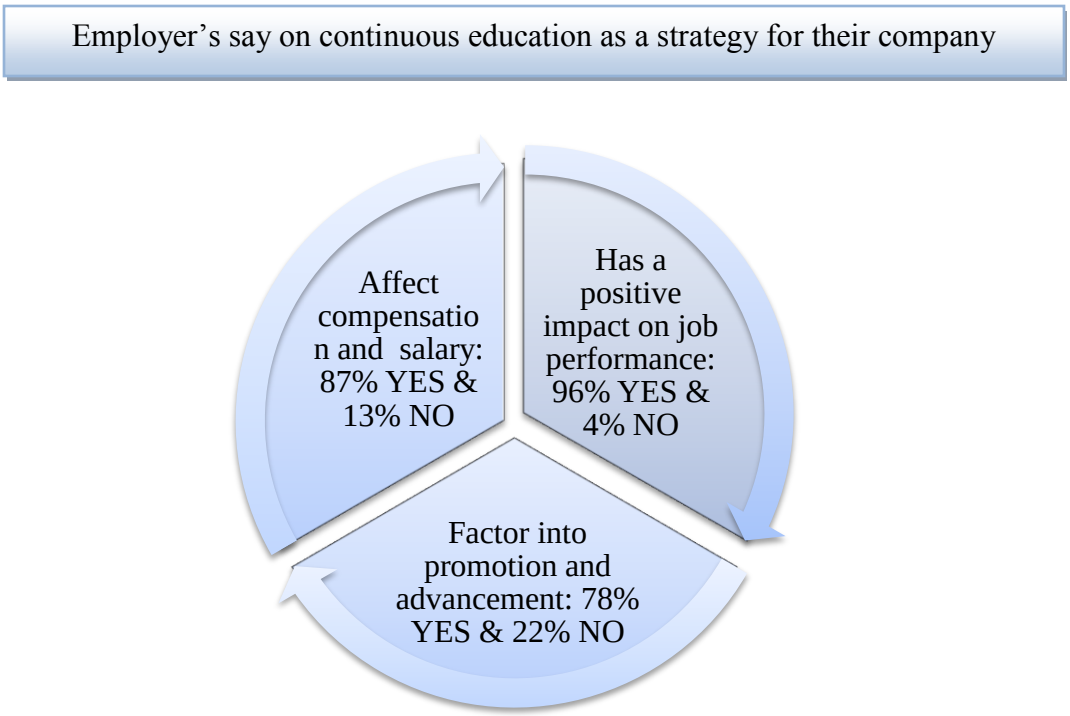
According to ‘The corporate learning fact book 2014’ adapted from Bersin by Deloitte “All our research tells us that organizations today suffer from a “skills supply chain” challenge. Not only do more than 70% of organizations cite “capability gaps” as one of their top five challenges, but many companies also tell us that it takes 3-5 years to take a seasoned professional and make them fully productive.” Globally, market for training expenditures in 2013 was approximately $306.9B, an raise from $291.7B in 2012. Thus the role of training or learning and development assumes significance here.

1.1.3 Role of Learning and Development in Talent Economy

The workplace in the contemporary organizations is characterized by a process where individuals go to work and learn as well. Training is no longer seen as expenditure but as an investment to outperform their competitors. As organizations thriving to learn and uphold their competitive edge, companies offer continuous job- relevant training to all employees of different levels, they also offer a range of resources for information; support the exchange of ideas, and constantly appreciate employees who acquire new skills. In fact, the movement toward outcome-based training is so strong in some companies; the professionals who provide such training refer to themselves as "performance improvement specialists." "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn." (Avlin Toffler, 1995) emphasizes the importance attributed to continuous learning. “Organizational learning’ is a fighting process for organizations in the face of swift pace of change.” (Peter Senge, 1990). “Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.” (The Fifth Discipline, Peter Senge, 1990)

The biggest challenge that organizations today face, is to enable effective utilization and development of employee's knowledge. Effective training programs designed to build stronger and skilled work forces have reshaped the identity of learning and development wing in an organization. Figure 1.1 depicts the importance attributed to continuous education by employers.

Figure 1.1 Importance of continuous education by employers



Source: Lifelong Education and Labor Market Needs, An Evolution Research Report, 2012

*"*Training is a critical process within the business, the quality requirement for training is no different than the quality requirement for any other critical process*"* as mentioned by Mike Wills, 1998. In this meta information age, learning and development wing has shifted its focus from imparting training to inducing learning to turn its workforce agile and flexible.

Learning and development wing is now responsible to design training that helps workforce meet the expectations of the job, fewer errors, and faster cycle time fostering creativity. In addition to the conventional classroom training and on the job training, e-learning as a training intervention gained momentum in the recent years with the electronically networked business world revolutionizing the way we work. For global organizations, classroom-based training is getting

very expensive and unwieldy. Remaining up-to-date in their area of work has become a necessity for the employees. According to a study, India has always been an vital hub for L&D industry because of its talent and knowledge driven economy. Many organizations are into a talent crisis as there is a scarcity of talented professionals mostly in the lead positions. “This challenge emerges as an opportunity for Indian L&D industry which is estimated to triple through 2014 due to a growing demand for experienced professionals” as mentioned in the report.

It has now become imperative for organizations to transform their learning to a contemporary, competent, and flexible alternative: eLearning, which could also resolve the problem of lack of skilled trainers. New information and communication technologies have come to support the organizations in providing training of this kind. “This new economy is based more on brains and brawn - and moves more on broadband byways than concrete highways" opines Ray Smith,2011, former Chairman, Bell Atlantic. “Organizations started investment in skill development of employees by providing access to convenient, technology-delivered instruction” (Baird, Griffin, & Henderson, 2003; Rosenberg, 2001). E-learning has been introduced as a training solution to keep pace with changes.

1.2 E-learning as a Training Medium to Develop Competencies of Knowledge Workers

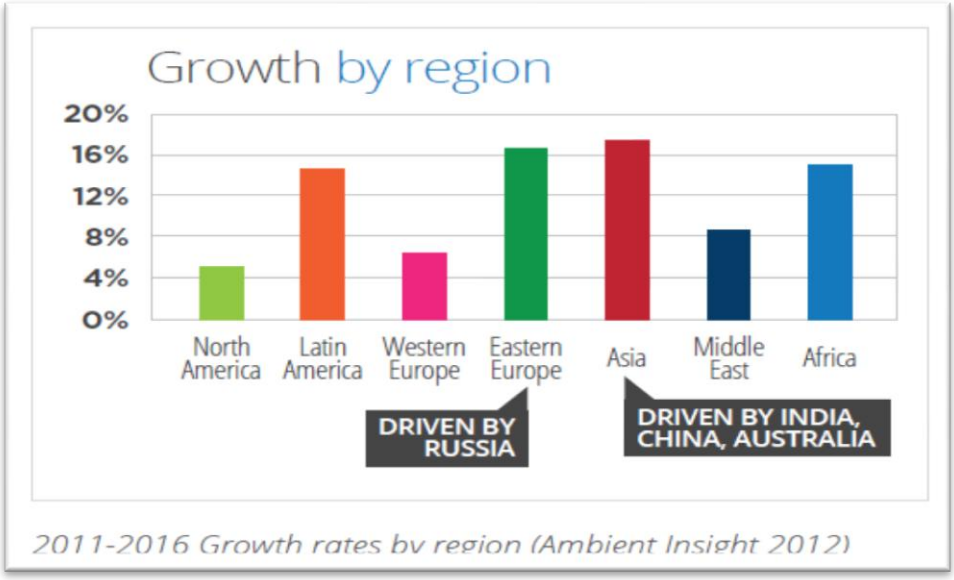
Going by E-learning Market trends and Forecast 2014-2016 Report, by Docebo, March 2014, there would be a surge in E-learning market in three years to come. The worldwide market for Self-Paced E-Learning reached $35.6 billion in 2011. The five-year compound annual growth rate is estimated at around 7.6% so revenues should reach some $51.5 billion by 2016. According to recent regional studies mentioned in Docebo report 2014, the highest growth rate is in Asia at 17.3%. "

Numerous technology tools are available to provide training today. Videos which are self-authored, several online communication tools, virtual learning environments, and Massive open online courses like Coursera, Udacity, Udemy, edX are all increasing being used as training tools. The number of hours spent by corporate in formal instructor led training have come down significantly whilst adoption of technology in training has accelerated. “18% of all training is now delivered through mobile devices in some of the advanced organizations”, as mentioned by Josh

Bersin in his article. Corporate has started investing in easy to use training websites and virtual learning environments. Alongside this development, Learning Management systems market is also increasing being utilized. MOOCs have also created a revolutionary wave in the history of training as more and more branded universities put courses online.

According to Workforce.com "73% of Training in Fortune 500 companies is delivered via online methods" and eLearning magazine 2013 says that 41.7% of global Fortune 500 companies use technology during formal training hours. Figure 1.2 depicts the growth rate of e-Learning across the globe.

Figure 1.2 Global e-learning growth rate



1.2.1 Definition of E-Learning

"E-learning covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaborations" as defined by the American Society for Training and Development (ASTD). "E-learning is the unifying term to describe the fields of online learning, web based training and technology delivered instruction" (agelesslearners.com).E-learning is an interdisciplinary field which includes education (Pedagogy, learning sciences, adult learning), computer science (Learning objects; Computer-supported cooperative work) and management (Knowledge management; Communities of Practice; Records management) (E-learning basics: Theory and Practices IBICT, June 2009). "The delivery of training materials,

information and connect directly to an employee's computer desktop by taking advantage of Web browser technology to purposefully change behavior or attitude" according to Kapp (2003). Hall and snider (2000) define e-learning as "the process of learning via computers over Internet and intranets and referred to as web-based training, online training, distributed learning or technology for learning".

1.2.2 Growth of E-learning in India

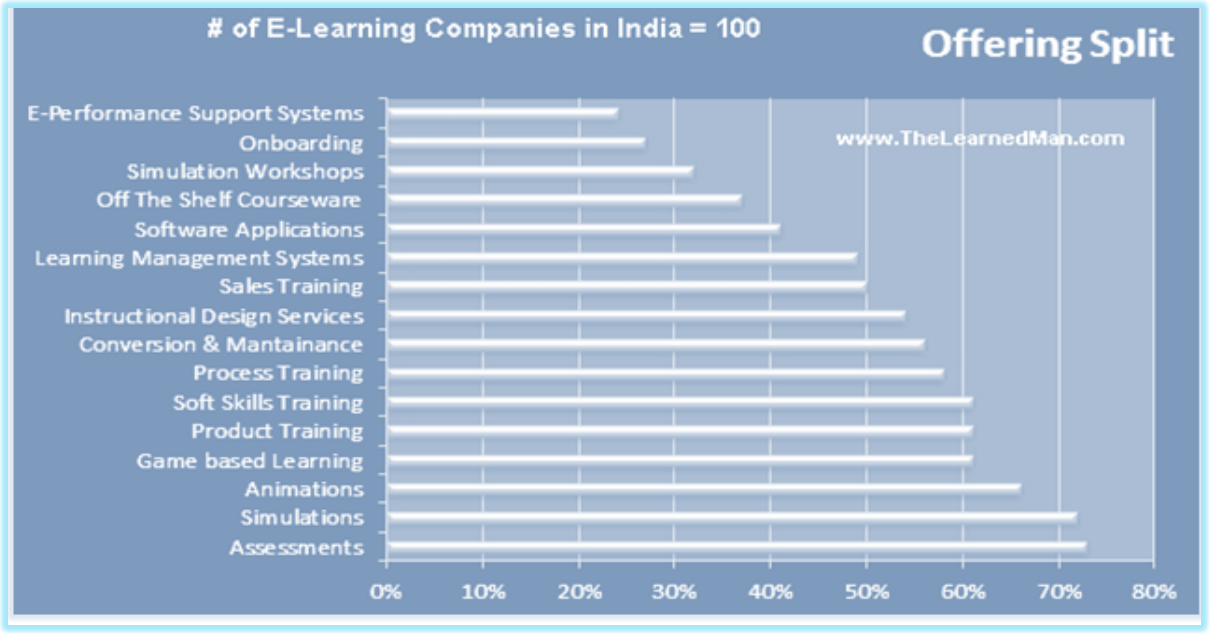
The Ken Research Group report, 'India's E-Learning Market Outlook to FY2018 – Increasing Technology Adoption to Drive Future Growth', estimates that the market should grow at a Compound Annual Growth Rate(CAGR) of 17.4% over the period FY2013 to FY2018. The Indian "E-Learning content market is expected to grow at a CAGR of 18.4%from FY 2014 to FY 2018" according to Docebo report 2014-2016.

Technology-based instruction includes computer-based training (CBT), multimedia CBT, online distance learning, training using videos, and internet usage for training. Most of the technology used is known as e-learning, which also includes virtual classrooms, Web-based courses, "Webinars," online collaboration and the recent trend m-learning which is called mobile learning in other words. Some experts like Harasim. Etal (1995) opines that 'e' in e-learning stands for experience and hence it offers a good learning experience. "The next big killer application on the internet is going to be education. Education over the internet is going to be so big it is going to make e-mail usage look like a rounding error" John Chambers, CEO of Cisco Systems, The New York Times1999. A Brandon Hall (premier group in e-learning market research) Study has shown that 40-60% of employee time can be saved. "Expansion of e-learning and its labeling as the second wave of the Internet reflects the recognition by the business world of the benefit to be gained through developing employees to be knowledge workers" as cited in 'Best practices in e-learning', INNOLEARNING project, 2013.

In congruence with expert's opinions, e-learning has certainly spread its wings to envelop the training programs initiated by organizations and has evolved, to keep pace with technology trends, some of the recent ones include: game based learning applications, interactive simulations and mobile learning, i.e. m-learning.

NIIT Technologies, IBM India, Tata Interactive Systems (TIS), Skillsoft, Sify E-learning, Lionbridge India, Educomp Solutions, Tutorvista, Harbinger Knowledge Products are some of the major leading e-learning players. Figure 1.3 depicts the split in services offered by e-learning companies.

Figure 1.3 Products and services offered by e-learning companies



The figure shows how e-learning has begun to increase its presence in the training landscape. Low cost PCs, growing broad band and several other factors have enabled e-learning make significant strides in India.

1.2.3 Factors Promoting the Growth of E-learning in India

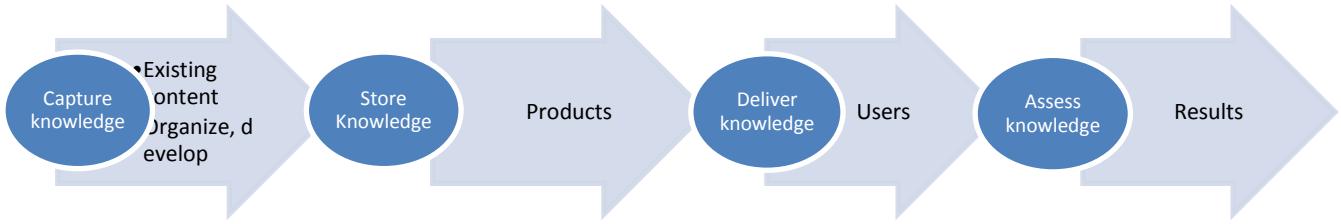
The factors like cost reduction, higher content retention, flexibility, ease of customization, effective monitoring and tracking systems have always been important for the promotion of e-learning ubiquitously. India is highly resourceful when it comes to technology and multimedia professionals in the world adding approximately three million professionals every year as reported by NASSCOM. Also, India is acquiring significance as a hub of E-learning content outsourcing. According to Bersin by Deloitte, an online course development project may cost 20-40 per cent less in India, and hence many E-learning projects are outsourced to India. Government initiatives to promote e-learning, increasing tablet penetration and high adoption have reinforced the stability

and good growth for e-learning market in India. Realizing the potential of this platform, the Indian corporate has begun utilizing e-learning for its employees' training. This study focuses on e-learning adoption and its effectiveness in Indian IT sector. With rapid and robust advances in technology there has been an advancement in components of e-learning too.

1.2.4 Components of e-learning

In 1970s and 1980s e-learning was just limited to videos and PC-based content, in 1990s it made use of internet to provide its services, in 2000s blended learning approach was practiced integrating electronic formats with traditional instructor led training. Now modern or next generation e-learning encompasses social networking, web-based learning, virtual collaboration, simulations, game based learning and mobile learning. A simple process of e-learning can be depicted as in Figure 1.4

Figure 1.4 Snapshot of E-Learning process



To enable the process of e-learning employs various technologies that could enable each of its functionality. Technologies of e-learning comprise mainly of course management systems like Learning management systems, virtual learning systems, while the technology components include Email, discussion lists, use of online library catalogues, electronic references, web searches, online quizzes. Web pages, blogging, wikis, podcasting, videos, Virtual worlds, online games, social networking sites, and participatory (Web 2.0 systems) are becoming common in e-learning. Devices used for e-learning are desktop, laptop, handheld computers and recently mobile phones usage in e-learning has gained momentum. Improved delivery modes such as tablets, iPad have created new platforms for e-learning. Organizations belonging to different sectors, Finance and Banking, IT, Manufacturing, Retail, Telecom, Pharmaceutical and Airlines Industry have started using e-learning for their training interventions. Organizations have come to realize that e-Learning can aid employees to get equipped with job functions' changing requirements in a shorter

time frame ensuring quality results. Deployment of e-learning components in corporate training is depicted in Table 1.1.

Table 1.1 Deployment of e-Learning in corporate training

Purpose	Current Usage
Competency/skills assessment	64%
Individual learning plans	48%
Learning resources linked to organizational goals	55%
Learning communities with collaboration technology	21%
Process and technology to share individual knowledge	46%
Technology to provide access to knowledge captured	44%
Access to e-Learning by the entire organization	34%
Learning/knowledge accessible through project or human resource management system	35%
Online registration and administration of learning	49%
Electronic catalogue of learning resources	48%
Tracking and reporting of learning and knowledge	48%

Source: The Forum Report, Volume 1, Issue 1

About 60 to 70% of the Indian E-learning industry vendors cater to the corporate training market and about 47% servicing the Education market. Amongst various industry sectors, the IT industry has emerged as one of the early adopters. It is vital for employees in IT industry to update their knowledge to keep pace with technological advancements and use them for their professional growth. Empowered with Tech savvy-learners and readily available infrastructure IT industry embraced e-learning as a training intervention. Majority of these modules mentioned are extensively used in IT and ITES industry and hence E-learning has been readily embraced by IT

industry for its workforce. Many larger IT companies have taken to e-learning while the mid-size and smaller companies are yet to venture as they have been observing how the technology, methods, and costs evolve before they come to a decision of embracing e-learning.

1.3 E-learning for Indian IT industry

Big Sized IT Organizations, to name a few, Caritor, Cognizant, HCL, Honeywell, L&T Infotech, Mindtree, PATNI, Tech Mahindra , Infosys, TCS, Virtusa, Wipro, Dell, Google, CA, etc, have already transitioned into e-Learning and embedded it as a vital component of their overall training efforts. Workforce in the IT industry are tech savvy equipped with necessary infrastructure and by definition are comfortable with using technology, leading to less resistance to implementation and usage of e-learning. It is vital for employees in IT industry to update their knowledge to keep pace with technological advancements, e-learning can provide them with the required self-paced learning modules. Certain learning components built into employees learning program can facilitate just in time learning which enables application of training in the immediate work environment, therefore increases the productivity too. HR Director of a reputed German steel company opined, 'Learning in the future must become better and cheaper. Learning what you need (aka, Bit-Learning.), and not, what's on stock, just-in-time, will be the way to go". So learning in shorter timescales, with accessibility at the point of need, with shorter sessions, and those sessions focused on the role they perform in the workplace is the need of the hour.

Strategic business units of majority of the multinational IT companies are spread across the globe. E-learning is used extensively for product training, process training, and compliance training across the units. On the job learning supported by internal subject matter experts, available at process based role could enhance organizational learning. Collaboration using web technologies enable virtual teams to work together. Online meeting products have gained momentum avoiding travel costs. End to end encryption and password based user authentication safeguards the Intellectual property aspect. Gradually India is moving towards developing corporate universities. Organizations like Tech Mahindra, Infosys etc have initiated the process and e-learning is being used to hone the skills of their human capital.

Cost effectiveness, its increased payback and flexibility are considered as important factors by employers to encourage e-learning in multinational companies of IT industry. At the other end, instant and easy monitoring of employees' learning progress stands out as an incentive for Learning and development wing of the organizations.

1.3.1 The Indian IT Sector – A Glance

Information technology (IT) industry in India has been a key driving force in placing India on the global map. IT industry in India has been one of the most significant growth contributors for the Indian economy. "The IT market in India is the third-largest among emerging economies and the fourth-largest among developing and mature Asia/Pacific countries" according to Gartner's report, October 2013. The sector has increased its contribution to Indian's GDP from 1.2% in FY1998 to 7.5% in FY2012. Over the years, verticals like manufacturing, telecom, insurance, banking, finance and lately the retail, have been the growth drivers for this sector. It is expected that the future growth of IT and IT enabled services will be fuelled by the verticals of climate change, mobile applications, healthcare, energy efficiency and sustainable energy. According to Gartner, the "Top Five IT Services Providers" are Tata Consultancy Services, Infosys, Cognizant, Wipro and HCL Technologies.

The near future of Indian IT industry seems to be promising as both Indian and global organizations target new verticals and provide low-cost, flexible solutions to customers. By 2015, IT sector is expected to generate revenues of USD 130 billion according to NASSCOM. The government, with its focus on e-governance, will continue to be a major spender. Most recent technology advancements in IT industry have been data analytics, cloud computing, moving from server centric to service centric.

1.3.2 IT Industry Challenges

According to NASSCOM, India stands at number one position in global ITS landscape where it accounts to 58% of industry exports and has witnessed a growth of 14.5% in domestic market during FY2013. The industry is knowledge intensive and offers ample opportunities to learn and grow. The industry has the potential to contribute as much as, 30 million employment opportunities by 2020. There is a huge talent gap and skills gap going by the 25% graduate employability reported by NASSCOM. The industry has been combating the challenges on its way

to growth and expansion. “The industry faces high attrition rate, the average tenure of an IT professional is less than 3 years” according to Gartner. Once IT professionals are satisfied their curiosity, they may abruptly lose interest and seek immediate change in job as mentioned by Watts Humphrey (1997), Fellow of CMU. Building end to end capabilities of fresh graduates that constitute entry level workforce and convert them into intellectual capital stands as a huge challenge which also forces them to get started with their own training colleges. The constant innovation of technology requires the employees to upgrade their knowledge at a rapid pace as the technology changes are totally unpredictable. Constant skill up gradation involves continuous learning which poses yet another challenge to the learning and development segment of IT industry.

International Data Corporation analyzes that the necessity to update employee skills in the implementation of complex technologies is one of the most important contributing factors to promote IT training. IDC also considers that it has become crucial for companies to train IT professionals before information is obsolete according to an article on Corporate E-learning by Bachman. Other factors contributing to the industry growth are robust changes in the advent of new technologies and new software products.

Collaboration using web technologies enable virtual teams to work together. Online meeting products have gained momentum avoiding travel costs. End to end encryption and password based user authentication safeguards the Intellectual property aspect. To meet the training challenges of the industry, there has been an increasing acceptance of e-learning in IT sector. “While formal, instructor-led training is not going away, it is becoming a smaller and smaller percentage of training budgets. Business, HR, and learning leaders must think differently about corporate training and focus on those informal and collaborative strategies that will save money and increase the breadth of organizational learning,” explains Josh Bersin, president of research and advisory firm Bersin& Associates. About 60 to 70% of the Indian vendors provide e-learning systems to the corporate training market and about 47% to servicing the Education market. Companies’ adopting collaborative and technologically-enabled learning models is described as E-learning adoption.

E-learning in the IT industry is mainly utilized for information broadcast, critical information transfer, to develop new skills and competencies or to enable certification of skills and proficiencies. E-learning adoption is rated according the stages an organization is into while in the

process of using e-learning for various functionalities. Final stage being e-learning used for learning on demand which implies that all digital resources (courses, references, help files, documents and presentations) are all provided to the work force on demand-just as an employee needs them.

Sustenance of e-Learning after its acceptance primarily depends on its effectiveness. Usually organizations tend to invest in e-learning technology ignoring the importance of learning aspect. According to Piccoli et al(2001), concerns like time spent on e-learning, labor intensiveness and resources required to run e-learning environments should be studied. Arbaugh and Duray(2000) have emphasized that the expensive failure rate of e-learning implementations deserves attention from managers and designers, while an in depth study is required to examine factors for successful implementation of e-learning. Although the proposed models of e-learning effectiveness have helped us understand how e-learning can improve learning, most of published models so far have not considered all the factors related to interactivity dimension, technology experience dimension, social dimension, utility dimension, learning environment dimension and motivation dimension. The current study aims at examining factors from various dimensions and measure e-learning outcomes as perceived by users.

According to Rumble *1997,* "Efficiency is the ratio of output to input and "Effectiveness is concerned with outputs." E-learning effectiveness is typically increasing the level of individual and organizations' performance levels which lead to better business results. In the context of the study, E-learning effectiveness is the success and efficacy of e-learning. *The current study examines the e-Learning adoption and its effectiveness in Indian IT industry. The literature cites several models of technology acceptance and the multiple factors that influence adoption and effectiveness of e-learning in an organization.*

1.4 Definition of Variables and Concepts used in this Study

Concepts and variables related to this research are described in this section, while chapter 2 focuses on the relevant literature explaining the terms contextually. Terms described in this section include mode of learning, self-efficacy, perceived usefulness, perceived ease of use, content quality, learning motivation, learning culture, achievement and satisfaction, e-learning transfer,

subjective norms, attitude towards training at workplace, computer anxiety, and internet experience.

1.4.1 Mode of e-learning

Mode of e-learning describes the learning system an organization follows while implementing e-learning. Blended and self-paced learning are two different modes of e-learning. Blended learning is typically explained as instructor led training along with computer mediated training by Wikipedia.Self paced mode is e-learning offered to trainees with a control over pace and convenience of their learning, basically taking the courses anytime from any place, at their own pace.

1.4.2 Self efficacy

In Social learning theory self-efficacy has been highlighted as an important concept (Bandura, 1977). Self-efficacy is an individual's belief in her/his capability to perform certain tasks successfully. In the e-learning context, it is trainee's perception of their ability to perform certain learning activities using a Learning management system. "Self- efficacy was found to exert a significant influence on individuals' expectations of the outcomes of using computers, their emotional reactions to computers (affect and anxiety), as well as their actual computer use" (Compeau and Higgins, 1995). "Self-efficacy is individuals' inclination toward a particular functional aspect; it is an evaluation for effects and the possibility of success before performing a task" (Marakas, Yi, & Johnson, 1998).

1.4.3 Perceived usefulness

It is the extent to which a person believes that using a particular technology will enhance his/her job performance (Davis 2001). Arbaugh (2000) found that perceived usefulness is associated with student satisfaction. In the current research work, perceived usefulness of e-learning is studied.

1.4.4 Perceived ease of use

Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989). In the context of study perceived ease of use is in relation to usage of e-learning during training is considered.

1.4.5 Content quality

"The content quality measures the quality of the course content and is concerning the accuracy, authenticity, accessibility, the design and the appropriateness of the course content "(Baker & Papp, 2004). Content quality is defined as the quality of design of e-learning program. A well designed e-Learning program can set the right tone of learning for learners. "Quality is another important factor influencing learning effects and satisfaction in e-Learning." (Piccoliet al., 2001).

1.4.6 Learning motivation

Learning motivation of trainees is the desire or aspiration to acquire the knowledge from the online training program. "It is the internal psychological process that causes the individual leaner to understand objective learning activity (incentives) and to spontaneously maintain the activity (needs, so as to guide the activity towards a predefined goal, thus satisfying the learning objectives (accomplishments)" (I Charlee, 2010)

1.4.7 Learning culture

Webster's definition of culture is the act of developing the intellectual and moral faculties especially by education. "By a continuous, encouraging learning environment members of the organization believe learning or training plays a crucial role in their job tasks" Tracey et al. (1995). The learning environment measure checks task allotment, and incentive for self-development. "A learning culture is a set of organizational values, conventions, processes, and practices that encourage individuals and the organization as a whole to increase knowledge, competence, and performance" as mentioned in Oracles' Human capital management article

1.4.8 Achievement and Satisfaction

In the context of the study, trainees' perception of their own achievement is treated as Achievement in e-learning. Allen et al. (2002) and Wang (2003) mentioned that the satisfaction of

a learner can be determined from his level of pleasure as well as the effectiveness of the education experienced. In the context of this study, the determinant is used as an initial measure for e-learning effectiveness.

1.4.9 E-learning transfer

Transfer of learning is defined in many ways by different researchers. "The effective and continuing application by trainees to their jobs, of knowledge and skills gained in training – both on and off the job" (Broad and Newstrom, 1992). Trainees' achievement of transfer refers to how well the trainees applied what they learned in training to their job tasks. "Transfer of learning is also defined as a fundamental assumption of educators. "We trust that whatever is learned will be retained or remembered over some interval of time and used in appropriate situations" (Ripple and Drinkwater, 1982). In the context of the study it is application of knowledge and skills gained by trainees gained through e-learning.

1.4.10 Subjective norms

"Subjective norms are a person's own estimates of the social pressure to perform the target behavior" according to theory of planned behavior (Ajzen, 1991). Subjective norms are assumed to have two components which work in interaction: beliefs about how other people, who may be in some way important to the person, would like them to behave (normative beliefs).

1.4.11 Training at workplace

''The degree to which the learner is willing to make efforts to improve his or her performance of training and work is motivation in a training environment'' (Robinson, 1985). ''Special desire of participants to learn the contents of the training program is the required motivation at workplace'' (Noe& Schmitt, 1986.The current study checks on the learner's attitude towards training at workplace by way of assessing the importance attributed by the trainee towards various aspects of training at workplace.

1.4.12 Computer anxiety

"Computer anxiety has been defined as a fear of computers when using one, or fearing the possibility of using a computer" (Chua, Chen, & Wong, 1999). "Computer anxiety is defined as an individual's apprehension or even fear, when she/he is faced with the possibility of using computers" (Simonson et al., 1987, cited in Venkatesh, 2000). Moreover, Howard (1986) defines that computer anxiety as the tendency of a person to experience a level of uneasiness over his or her impending use of a computer.

1.4.13 Internet experience

Internet experience can be defined as the extent of a person's experience to perform specific tasks using the internet. Kerka (1999) argued that "learner success in distance learning depends on technical skills in computer operation and Internet navigation as well as the ability to cope with the substantive subject matter". Some studies have included internet experience as an external variable while analyzing intention to use distance and E-learning (Fusilier & Durlabhji 2005; Kerka 1999, Rezaei et al. 2008).In the context of the study the trainee's experience with the internet is assessed. It is examined in the context of the impact it could have on his e-learning practices.

1.5 Significance of the Study

Broadly this study tests earlier theories and how strong different factors identified impact the adoption of e-learning and thence e-learning effectiveness. More specifically this study assumes academic and professional significance from the following dimensions.

(a) An understanding of e-learning delivery pattern and tools most widely used, perceived benefits the organizations in India assume they obtain from implementing, kind of training e-learning is used for and e-learning maturity levels of organizations indicating their adoption status.

(b) The predictive e-learning adoption status is tested in the Indian IT industry context.

(c) The study measures the impact of factors employees of IT industry consider significant to their e-learning, both in terms of adoption and effectiveness.

(d) A valid and reliable instrument to measure e-learning adoption and effectiveness.

(e) Current research study also provides the theoretical and practical knowledge base of e-learning in Indian IT industry.

(f) The importance of some influencing factors categorized into appropriate dimensions enables an understanding of e-learning adoption in Indian IT industry.

(g) Measuring training effectiveness is a key challenge for organizations; this study examined the factors influencing trainees' behavioral intention to use e-learning a training tool and eventually measures training outcomes as perceived by e-learning users.

The research design of this study has taken into consideration the related theoretical concepts and the sampling strategy allowed wide variance in employee designation and geographical location. The study aims at providing a knowledge base for those who develop, implement and deliver e-learning systems providing them with a comprehensive view on application of e-learning. This chapter included an introduction to the study, the purpose and significance of the study, and definition of key concepts and related terms. The relevant literature associated with e-learning adoption and effectiveness as well as the factors influencing them is reviewed in the next chapter.

CHAPTER II

REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

The existing literature in the area of e-learning is vast. The intent of this chapter is to examine various e-learning models, factors influencing e-learning effectiveness and adoption. The research gaps are identified towards the end. The review of literature is presented in three sections. First, the models of technology acceptance in e-learning are discussed. A review of influencing factors in e-learning is presented. The third section discusses the research gaps identified by the study.

2.1 Evolution of research models related to e-learning adoption

E-learning, a technology initiative, turned into a training medium over the years. For organizations, eLearning is no longer a training tool but also a performance enhancement tool. Besides considering the potential of e-learning as training medium, it is still perceived as a challenge to persuade organizations and employees to adopt e-learning and embed it into their main stream on the job training. To measure e-learning adoption users' tendency to accept technology needs to be assessed, According to Wang (2003) "The measurement of e-learning must incorporate different aspects of user perceptions to form a useful diagnostic instrument'.

Wide-ranging research studies have been conducted on technology acceptance and theories of information system (IS) use have been analyzed through TRA (Theory of Reasoned Action and TPB (Theory of Planned Behavior), which have proven successful in identifying and analyzing behavior across different business domains (Adams, Nelson, & Todd, 1992; Agarwal & Prasad, 1997; Christensen, 1987; Davis, 1989 and 1993). Based on TRA, Davis (1989) introduced the technology acceptance model (TAM) which has given an explanation of the determinants of computer acceptance by end users (Chau, 1996; Hu, Chau, Liu Sheng, & Tam, 1999; Venkatesh& Davis, 1996, 2000).

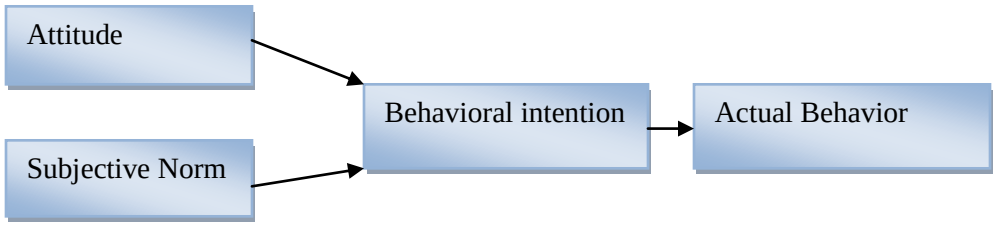
Several factors were discussed by many researchers from psychology and information systems field to comprehend the acceptance and adoption of technology, and subsequently e-learning. There are two theories that have been extensively applied in the analysis of the use of technology, namely the Theory of Reasoned Action (Fishbein &Ajzen, 1975), and Technology

Acceptance Model (TAM) (Davis, 1986). Thus, knowledge of the factors that influence e-learning adoption and their associations serve as a platform to a complete understanding of trainees' acceptance of e-learning systems.

2.1.1 The theory of reasoned action (1980)

The theory was put forth by Fishbein and Ajzen(1975, 1980). The TRA postulates that the strongest or the most proximal predictor of volitional behavior is one's behavior intention. Behavioral intentions are thought to be the result of both individual influence and a normative influence. While the individual influence is the person's attitude towards performing the volitional behavior, the normative influence is the subjective norm. Figure 2.1 depicts the determinants of behavioral intention to use technology according to theory of reasoned action.

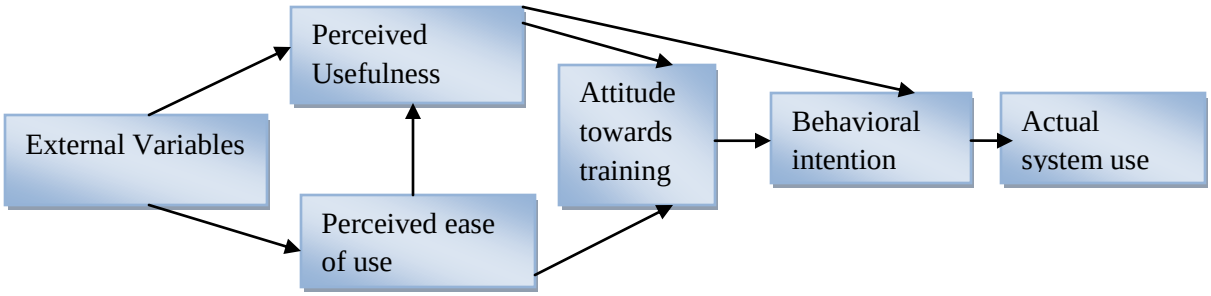
Figure 2.1 Theory of reasoned action



2.1.2 Technology Acceptance Model (1986)

Further Davis (1986) developed the Technology Acceptance Model (TAM) model based on Fishbein's and Ajzen's work. "To date, TAM has become one of the most widely used models in the field of ICT" (King & He, 2006). The motive of the model is to explain the determinants of computer acceptance among users. "It explains user behavior across end-user computing technologies and user population." (Davis, et al., 1989).

Figure 2.2 Technology Acceptance Model

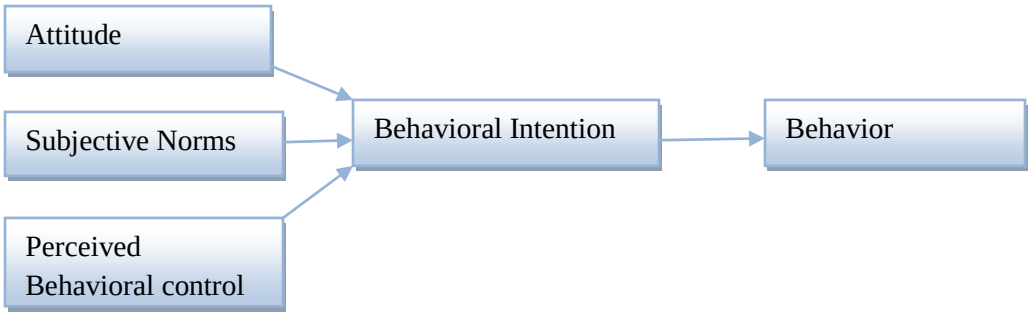


In TAM, *perceived usefulness* refers to the degree to which the user believes that using the technology will improve his or her work performance, while *perceived ease of use* refers to how effortless he or she perceives using the technology will be. Both are considered distinct factors influencing the user's attitude towards using the technology. Extended TAM 2 model, postulated by Venkatesh and Davis (2000) describes that job relevance; output quality, result demonstrability, and perceived ease of use determine usefulness of a system which in turn leads to behavioral intention to use system.

2.1.3 Theory of planned behavior (2000)

In an effort to understand workers' decisions about technology usage and their attitudes toward adoption of technology, Morris and Venkatesh (2000) used the Theory of Planned Behavior. This model has been used by Fortin (2000) to study the behavior of "clipping online coupons." In recent times, Troung (2009) used the theory to study consumer acceptance of online video and television services.

Figure 2.3 Theory of planned behavior

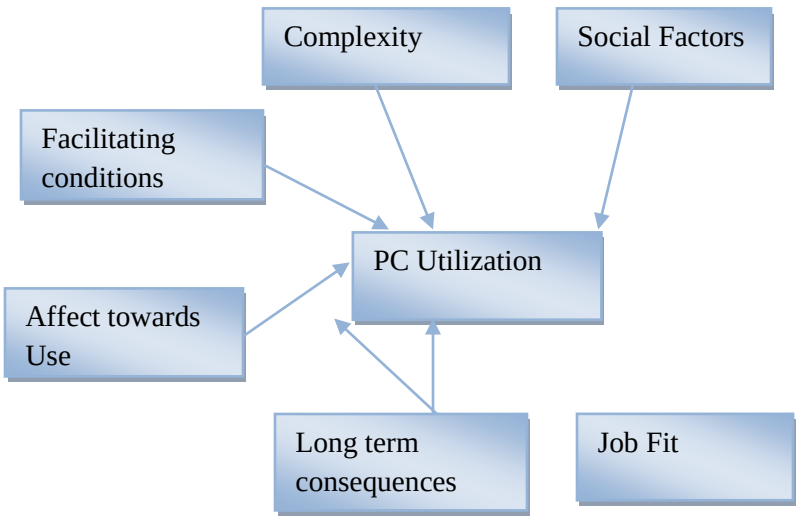


The person's attitude (A), subjective norms (SN), perceived behavioral control (PBC) influence behavioral intention of an individual which results into behavior. Perceived behavioral control (someone's perception of the presence or absence of requisite resources and opportunities to perform a behavior of interest) is a product of belief (a perception of the availability of skills, resources, and opportunities) multiplied by perceived facilitation (an assessment of the importance of those resources to the achievement of outcomes)

2.1.4 Model of PC Utilization (1991)

Model of PC Utilization was proposed by Thompson et al (1991) using major constructs as (a) Job-fit defined as "the extent to which an individual believes that using [a technology] can enhance the performance of his or her job" (b) Complexity defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (c) Long-term consequences defined as "Outcomes that have a pay-off in the future" (d) Affect Towards Used defined as "feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act" (e) Social Factors defined as "individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations" (f) Facilitating Conditions defined as "provision of support for users of PCs may be one type of facilitating condition that can influence system utilization" as expected determinants of users' behavior leading to computer utilization.

Figure 2.4 Model of PC Utilization



2.1.5 The Innovation diffusion theory (1995)

The Innovation Diffusion Theory (Rogers, 1995) has been used to study a variety of innovations. Rogers identifies five attributes of an innovation that influence the adoption and acceptance behavior: "relative advantage, complexity, compatibility, trialability, and observability". In the Information Systems field, Moore and Benbasat (1991) expanded these attributes set to study information technology acceptance. The set includes: Relative Advantage: "the degree to which an innovation is perceived as being better than its precursor" Ease of use: "the degree to which an innovation is perceived as being difficult to use" Image: "The degree to which use of an innovation is perceived to enhance one's image or status in one's social system" Visibility: The degree to which one can see others using the system in the organization. Compatibility: "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" Results Demonstrability: "the tangibility of the results of using the innovation, including their observability and communicability" Voluntariness of Use: "the degree to which use of the innovation is perceived as being voluntary, or of free will" .

"Innovation diffusion research regards individuals' perceptions about these characteristics of an information technology as important factors in influencing an individual's acceptance behavior" (Agarwal and Prasad, 1997, 1998; Karahanna et al.,1999; Plouffe et al., 2001). "Thus far, numerous studies successfully integrated IDT into TAM to investigate users' technology acceptance behavior" (Hardgrave, Davis, & Riemen schneider, 2003; Wu & Wang, 2005; Chang & Tung, 2008).

2.1.6 Social Cognitive theory (1995)

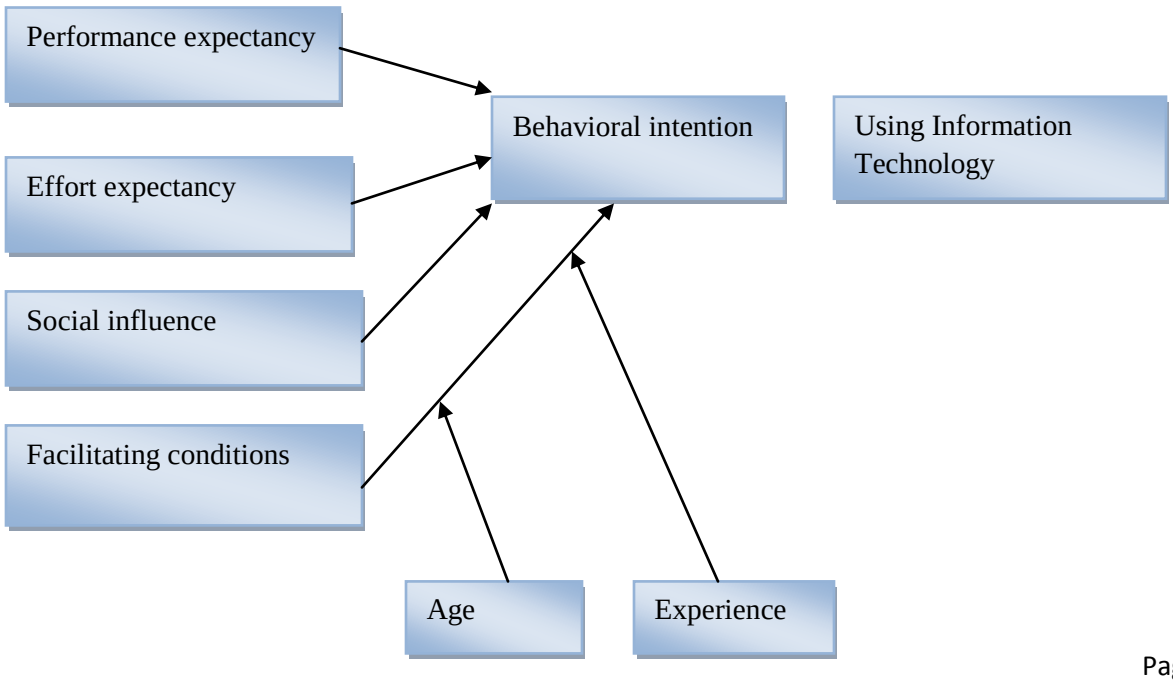
Compeau and Higgins (1995) extended social cognitive theory to the context of computer utilization. They studied computer use but the model proposed also can be extended to use of information technology in general. Constructs used are Outcome expectations performance defined as performance expectations dealing with job related outcomes. Outcome expectations personal defined as personal expectations dealing with individual esteem and sense of accomplishment. Self-efficacy defined as one's ability to use a technology to accomplish a job. Affect defined as

person likes for a particular behavior (computer use) Anxiety defined as evoking anxious or emotional reactions when it comes to performing a behavior (eg: using a computer).

2.1.7 Unified Theory of Acceptance and Use of Technology (UTAUT) (2003)

Later Venkatesh et al. (2003) have come up with a new model termed as the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT suggests that three constructs, performance expectancy, effort expectancy, and social influence determine the intention to use information technology. Performance expectancy is defined as "the degree to which the user expects that using the system will help them attain gains in job performance". This new construct has five root constructs: perceived usefulness, extrinsic motivation, relative advantage and outcome expectations from the earlier theories stated. Effort expectancy is defined as "the degree of ease of use associated with the system" Social influence is defined as "the degree to which an individual perceives that important others believe that he or she should use the new system" Venkatesh et al. (2003) also find that "the influence of facilitating conditions on usage is moderated by age and experience of the individual". They define facilitating conditions as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"

Figure 2.5 Unified theory of acceptance and use of technology



2.1.8 Technology Readiness Index (2000) and Moguls Model of computing (2004)

There was another model proposed by Parasuraman, 2000. Technology readiness (TR) refers to "people's propensity to embrace and use new technologies to accomplish goals in home life and at work" (Parasuraman, 2000). Further the beliefs have been categorized into four dimensions: optimism, innovativeness, discomfort, and insecurity (Parasuraman, 2000). While the dimension optimism captures positive feelings about technology, innovativeness is about the degree to which they perceive themselves adopting technology. Discomfort measures fears and concerns of users when confronted with technology while insecurity is about concerns people may have in face of technology-based transactions. Recently the Moguls Model of Computing (Ndubisi et al., 2004) has been proposed to understand e-Learning adoption. All these models have put forth critical factors that impact e-learning adoption according to researchers. Studies conducted using these models have reinforced the importance attributed to these factors as defined by theory.

2.2 Factors influencing e-learning adoption and E-learning effectiveness

Recently, many MIS researchers have published studies on e-learning in IT or MIS journals (Ijab& Anwar, 2004; Ong, Lai, & Wang, 2004; Neville, Heavin, & Walsh, 2005; Piccoli, Ahmad, & Ives, 2001; Zhang & Zhou, 2003; Wild, Griggs, & Downing, 2002;). Specifically, studies on e-learning effectiveness has emerged as a vital theme and many studies are found since 2004 (Dougla& Van Der Vyver, 2004; Cappel&Hayen, 2004).

Chen et al in a recent literature review stated that “there are studies which applied technology acceptance Model in various information technology and information system areas”. Some researchers have used the Technology Acceptance Model to understand and analyze the end users’ acceptance of World-Wide-Web context. Lin et al. (2007) extended Technology Acceptance Model to clarity the e-stock users’ behavioral intention. Chen and Chen (2009) reexamined the Technology Acceptance Model to understand the automotive telematics users’ usage intention. Stern et al. (2008) proposed a revised Technology Acceptance Model to investigate the consumers’

acceptance of online auctions. Serenko et al. (2007) modified Technology Acceptance Model to assess user acceptance of interface agents in daily work applications of e-learning.

It has also been observed in a few studies that "demographic variables may have the potential to influence e-learning adoption, especially when social factors are considered" (Ong and Lai, 2006). When it comes to implementing e-learning in their organizations, employers should have a strategic approach considering the influence of various factors, including employee attitudes and perceptions that can either lead to success or failure of the corporate e-learning strategy. The variables and influencing factors in the current study have been identified considering all the previous researches and corresponding models proposed by researchers.

2.2.1 Studies related to e-learning perceived ease of use

Empirical investigations conducted based on Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM) have inferred that trainees' reaction to technology use has its effects on trainee's performance (Davis 1980). Studies conducted based on learning theories consider learner control (defined as learners' control experienced in learning processes and methods in accordance with his needs and pace) as an important factor that contributes to learning effectiveness (Wydra, 1980). Therefore it may be construed that perceived ease of use impacts trainee's adoption to e-learning and further its effectiveness.

2.2.2 Studies related to perceived usefulness of e-learning

Perceived usefulness is one of the most important factors according to the previous theories and models proposed. Previous research done under different task environments in the context of e-Learning has highlighted this factor to be influencing e-learning adoption and effectiveness. Ford and Wroten (1984) recommend that training effectiveness should be evaluated by the relevance of training program content to the job. It is a universal to any training activity that importance is attributed to training content as it plays a crucial role in training effectiveness, but from a learners' perspective usefulness of the material provided is always determined by trainees' themselves and not by the content or material provided. Meaningful learning occurs when the learning content

conforms to the learning goals (Rogers 1969). According to Pintrich and Schrauben (1992), a higher perceived task value (i.e. the belief in the expected value of a learning task) can result in a higher performance of trainee. Wang (2003) also mentions that learners' e-learning adoption intention is affected by appropriateness of e-learning content and tasks.

Studies on training transfer also imply that training contents' usefulness affects the training outcome (Axtell etal, 1997). Alliger, Tannenbaum, Bennett, Traver and Shotland (1997) point out that, only when the trainees perceive the training content useful and practical do they apply skills acquired from the training in their job. Chiu, Hsu, Sun, Liu and Sun (2005) demonstrated that perceived usefulness influence positively e-learningeffectiveness. Pei-Chen Sun et al (2006) in their study on successful e-learning drivers, have examined the critical factors influencing e-learner satisfaction. The results revealed that perceived usefulness in addition to a few factors affect learners' perceived satisfaction. In addition, Johnson, Hornik and Salas (2008) established that perceived usefulness influence positively e-learning successful. Hence perceived usefulness is treated as a crucial factor influencing an employee's intention to use e-learning.

2.2.3 Studies related to Learner motivation

Rosenberg (2001) emphasizes that research is needed on motivation of employees and choices made by them while they balance competing demands of work and learning in the context of e-learning at work. "Motivation to learn has been defined as the specific desire of the employee to learn given programs' content" (Noe, 1986). Colquitt, LePine, and Noe (2000) demonstrated that this construct is related to a variety of learning outcomes across studies. In one of the studies done, Noe and Wilk (1993) observed that "motivation to learn generally predicts participation in development activities, such as attending conferences and workshops" (Tharenou, 2001). Since trainees' engagement in e-Learning that is asynchronous and self-paced requires similar personal initiative, motivation to learn can be treated as an important predictor of time spent using e-learning contributing to the performance improvement which is e-learning effectiveness.

Another study conducted by Hicks and Climosky (1987), to measure the training effectiveness and its outcomes, measures of motivation to learn has been taken as an important variable. Noe (1986) proposed an integrated model of motivational influences on training effectiveness. Baldwin and

Ford (1988) then built a model of training transfer. Holton (1996) came up with an enhanced three-level training evaluation model based on Kirkpatrick's model of training evaluation.

In one of the recent studies, Ahmed Gad abdel- Wahab (2008), in an effort to understand users' intent to adopt e-learning and effectiveness has come up with five impact factors which include attitude towards e-learning, perceived usefulness, perceived ease of use, pressure to use e-learning and availability of resources to use e-learning.

In the current study, since the target sample is from IT industry, it is assumed that the trainees are provided with pertinent resources. Transfer of training through e-learning entails employees to be self motivated and self directed (taking the ownership of their learning) to result into learning effectiveness. From Freedom to learn theory, acquisition of knowledge gets improved and learning effectiveness gets boosted only when learners attempt to discover new concepts widening the horizons of their intelligence. In simple terms, trainability is determined by the trainees' level of ability and motivation for learning (De Simone & Harris, 1998). Hence learner motivation has been considered as one of the factors to be examined in the current study.

2.2.4 Studies related to trainees' attitude towards training at workplace

Researchers have proposed theories on relation between learning and technologies (Chau & Wang, 2000; Parikh & Verma, 2002) and distance learning as a form of e-learning (Kodama, 2001; Theakston, 1999) published in International Journal of Information Management. ''The degree to which the learner is willing to make efforts to improve his or her performance of training and work is motivation in a training environment'' (Robinson, 1985). ''Special desire of participants to learn the contents of the training program is the required motivation at workplace'' (Noe& Schmitt, 1986. So, going by the theoretical knowledge, trainees' attitude towards training at workplace affects trainees' learning outcome. In the study by Mathieu, Tannenbaum, and Salas (1992), results showed that trainees exhibited more encouraging emotional reactions when they had higher pre training motivation.

Attributes like job tenure, organizational commitment, job involvement, and career planning, have been studied extensively in management training research (Mathieu, et al., 1992; Mumford, et al.,

1988; Noe, 1986; Tracey, et al., 2001; and Warr and Bunce, 1995). The factors have also been analyzed in the context of organizational and training research, and found to play a role in trainee's motivation to learn and on skill transfer to the workplace (Birdi, et al., 1997; Mathieu and Farr, 1991; Naquin and Holton, 2002; and Noe and Schmitt, 1986).

In a recent research work by Burke and Hutchins (2007) it is mentioned that in an employee training and learning context, requirements of the management system are a form of extrinsic motivation, which includes reward, promotion, pay rise and higher scores in performance evaluation according to Facteauetal (1995). Kontoghiorghes (2004) mentioned that content/task relevance provide a better job utility, extrinsic motivations provide a better career utility through his empirical study. Lee and Pucil (198) mentioned that "briefing on expected goals of training can aid learners comprehend expected levels of learning achievement or job achievement which has significant effects on training outcomes". Several studies have highlighted that a stronger extrinsic motivation (for example, when performance is incorporated) can impact employee's intention positively and help learners' engagement in training activities. This aspect, trainees' attitude towards training at workplace holds its significance in the context of e-learning and hence has been considered as a factor in the current study.

2.2.5 Studies related to perceived self-efficacy in e-learning

According to Chau and Wang (2000), Computer self-efficacy is an important trainee characteristic for e-training situations. Compeau and Higgins (1995) specified that a person's self-efficacy regarding computers significantly affects the user's expectations and performance. There has been extensive research work done with the concept of self-efficacy affecting training effectiveness. Gist, Shwoerer, & Rosen (1989) have considered it in their study on computer software learning. Gist, Stevens, & Bavetta (1991) have studied self-efficacy in an interpersonal skills training context while Eden & Ravid (1982) have studied it in the context of military training program. Chau & Wang, 2000 have conducted study on homepage design training course and examined role of self-efficacy of trainee as a part of it. "Empirical evidence shows that e-learning projects that were not successful in achieving their goals did not have access to technical advice and support." (Alexander & McKenzie, 1998; Soong, Chan, Chua, & Loh, 2001). Thus perceived self-efficacy of a trainee in the context of e-Learning has been included as a factor to be studied.

2.2.6 Studies related to subjective norms in e-learning

According to Fishbein and Ajzen (1975), subjective norms refer to "the person's perception that the most people who are important to him think he should or should not perform the behavior in question". Havelka (2003) explained subjective norms as "a person's perception of the social pressures applied to perform or not perform the behavior in question by important referents". The subjective norms effect on the intention behavior toward the acceptance and usage of technology has been explored intensively in the literature.

Many theoretical and empirical evidences implied role of subjective norms on technology use, directly or indirectly, through perceived usefulness in the workplace (Lee 2006, Taylor & Todd 1995, Venkatesh & Davis 2000). Ndubisi (2004) in his study has used Theory of planned behavior to identify the factor that affect the intention to adopt e-learning. He identified factors as attitude, which include preserved ease of use, perceived usefulness, security, and subjective norms. Therefore, this research study has included subjective norms as one of the factors that affect the e-learning adoption.

2.2.7 Studies related to content quality in e-learning

Moore (1989) defined three types of interaction in learning: learner–instructor, learner–learner, and learner–content. In the context of e-learning, interaction between learner and content becomes a significant factor.

"Interaction is a crucial factor for learner satisfaction, higher levels of learning achievement, higher learner engagement, and a positive attitude toward distance education" (Chapman, Selvarajah, and Webster 1999; Fredericksen et al. 2000; Fulford and Zhang 1993)

The content quality measures the quality of the course content in terms of its accuracy, accessibility, authenticity, the user interface design and the relevance of the course content (Baker & Papp, 2004). The content quality ensures that the target groups of learners meet the course

objectives. The content quality has been considered as a critical success factors for the e-learning by many researchers through their empirical studies (Lee 2006, Papp 2000). According to Baker and Papp (2004), a requirement of a successful course in an online learning model is the quality of the content. Thus a trainees' motivation can be enhanced through effective delivery of subject matter. It is also important for the content to be user-friendly with easy navigation mechanism embedded. Papp (2000) stated that regular updation of content would lead to students' perception of e-learning system as useful means of gaining new knowledge and learning). "The content which is rich, manageable and updatable regularly, the student finds it useful and may affect their performance" Lee (2006). This research study therefore considers perception of content quality in e-learning as an influencing factor of e-learning adoption.

2.2.8 Studies related to computer anxiety in e-learning

According to Simonson et al (1987) computer anxiety is defined as an individual's apprehension or even fear, when she/he is faced with the possibility of using computers. Computer anxiety in relation to intention (Elasmar & Cartar, 1996) has been studied was also analyzed regarding its influence on behavior (Compeau & Higgins, 1995), and similarly on learning of the individual (Martochio, 1994). It has also been studied in the context of its relation to learner's performance (Anderson, 1996). "It is different from negative attitudes toward computers that entail beliefs and feelings about computers rather than one's emotional reaction towards using computers." (Heinssen, Glass, & Knight, 1987). Hence computer anxiety is included as one of the factors influencing e-learning adoption. Though the target trainees considered in this study belong to IT industry, it is still included to check if the factor has any influence on e-learning.

2.2.9 Studies related to internet experience

Studies using the TAM have proposed that an individual's experiences with a specific technology influence perceptions of ease of use and usefulness of that technology. Many empirical research studies have used the internet experience of the end user as a precursor in technology intention model and have analyzed the relationship between perceived ease of use and perceived usefulness (Chang 2004; Wolk 2007). Fusilier and Durlabhji (2005) conducted an empirical study to explore behavioral intention of users' intention in internet technology. They reported that the level and rate

of experience play a significant role on the intention to use a particular system. Hence internet experience is included as one of the factors influencing e-learning adoption.

2.2.10 Studies related to learning culture of an organization

Several researches have suggested that a supportive work environment is essential for encouraging participation in learning experiences (Kozlowski & Hults, 1987; Maurer & Tarulli, 1994; Noe & Wilk, 1993; Tharenou, 2001). Institutional theory proposed by Orlikowski (1992) states that "over time, habitual use of practices such as ways of supervisor' support, coordinating a meeting, or evaluating an employee eventually becomes institutionalized, forming the structural properties of organizations". Hence organizational learning environment and learning culture gain importance in a study related to training effectiveness.

Baldwin and Ford (1988) pointed out that senior management support and organization atmosphere have an impact on training effectiveness and application rate. According to them, training effectiveness affects application rate, and therefore senior management support and working atmosphere are directly related to the application rate of learning.

In the research study conducted by Tracey, Tannenbaum, and Kavanagh (1995), they defined continuous learning culture as: "designing a challenging work responsibility schedule to develop employees' potential, fully compensating for self-developing effort, and emphasizing the improvement and renovation of the working environment". Their results showed that continuous learning culture has significant impact on training and training transfer. The preposition that organizational environment affects training effectiveness has also been studied and proved in Korea through an empirical study (Lee, 1995). The relationship between organizational environment and training effectiveness is significant in the online training environment.

Moreover studies on organizations have found that organizational culture plays the role of a situational enhancer for employee behaviors (Howell etal 1966). Schneider etal (2005) argued that trainees' behavior signals will be formed in an atmosphere of organizational culture highlighting importance of tasks in the organization. In a study conducted by Dewar and Whittington (2000)

they stated that the new technologies provide opportunities for creating learning environments that enhance learner learning and achievement.

Several studies have emphasized that a continuous learning culture can contribute to goal centric trainees' learning attributing importance to learning as a performance enhancement mechanism. Baldwin and Ford (1988) presented an integrated model on the process of learning and transfer. According to them, the trainees' personal characteristics and organizational environments affect both learning performance and transfer performance. Therefore learning culture in an organization can get employees to engage and participate more in e-learning activities. Learning culture with co-learning companions or with subjects to learn or imitate from can increase employees' learning motivation eventually resulting in better learning performance. Thus learning cultureis considered as a factor influencing trainees' intention to embrace e-learning.

2.2.11 Studies related to Training Evaluation

Organizations invest in many forms of training and training evaluation has been attributed a lot of importance both by practitioners and academics alike. However, the most significant problem is that there is no clear definition of e-learning effectiveness (Hodges, 2009). Few organizations comprehensively evaluate their training programs in a manner meaningful to their business (Kraiger, 2002; Nickols, 2005; Twitchell et al., 2000). (Kraiger, 2002; Twitchell et al., 2000). In addition, management is often not interested in evaluation data—evaluation is not considered important or a priority (Kraiger, 2002). Moller et al. (2008) report that program evaluation is rarely planned and when it is, companies do not know what to measure and how to use the information obtained.

The choice of evaluation criteria is a critical decision when evaluating the effectiveness of L&D (Arthur, Bennett, Edens, & Bell, 2003). The integration of new technologies into the learning process presents new complications to the already challenging nature of evaluation (Galloway, 2005). Although the obvious and currently accepted evaluation method for e-learning is traditional L&D models, currently there is no single theory that exists which has been shown to predict e-learning effectiveness (Hill &Wouters, 2010).

Kirkpatrick's (1976) model of evaluation is widely recognized in both practitioner and academic literature as a means of assessing whether training has been successful at an individual and organizational level, as well as for creating an evaluation strategy (Goldstein & Ford, 2002; Kraiger, 2002; Nickols, 2005; Salas & Cannon-Bowers, 2001; Sutton & Stephenson, 2005). A number of authors have stated that Kirkpatrick's classic model is also applicable in an eLearning context (Galloway, 2005; Kramer, 2007; Moller et al., 2008; Ruiz, Mintzer, & Leipzig, 2006). The model has four levels of evaluation which is depicted in Table 2.1

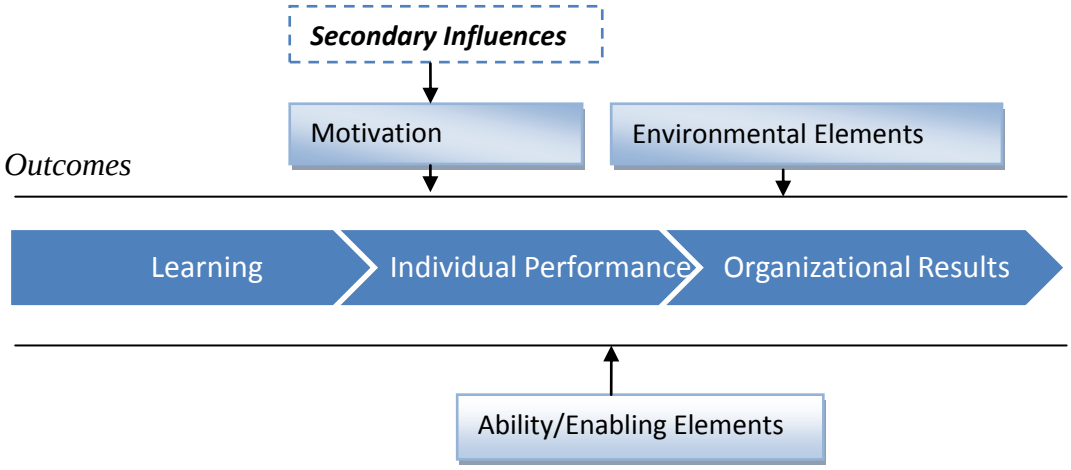
Table 2.1 Snapshot of Kirkpatrick's model of evaluation

Level	Evaluations type (What is measured)	Evaluation description and characteristics
1	Reaction	Reaction evaluation is how the delegates felt about the training or learning experience.
2	Learning	Learning evaluation is the measurement of the increase in knowledge - before and after
3	Behavior	Behaviour evaluation is the extent of applied learning back on the job - implementation.
4	Results	Results evaluation is the effect on the business or environment by the trainee.

Level one—Reaction is referred to as the degree to which participants react favorably to the training. The second level—Learning—refers to the degree to which participants acquire the intended knowledge, skills, attitudes, confidence, and commitment based on their participation in a training event. Level three—behavior—refers to the degree to which participants apply what they learned during training when they are back on the job. Level four—Results—assesses to what degree targeted organizational outcomes occur as a result of the training event and subsequent reinforcement (Kirkpatrick, 1976).

Holton (1996) developed the Transfer of Training Model which focuses on individual performance and factors influencing it. The model is depicted in Figure 2.6.

Figure 2.6 Transfer of Training Model (Holton 1996)



The primary outcomes of training identified by Holton (1996) are learning, individual performance, and organizational results. The model assumes that there are three primary factors that affect the transfer of training: trainee reactions, motivation to learn, and ability. Primary and secondary influences on outcomes are included. This study aims at identifying factors which influence e-learning effectiveness.

2.2.12 Studies related to e-learning effectiveness

Many researchers who study traditional vocation training point out the importance of training effectiveness evaluation, while recognizing its difficulty (Alliger et al., 1997; Carnevale & Schulz, 1990). Majority of the research works done in the area of training evaluation have been inclined towards measuring trainee reactions towards the training program offered and the degree of learning from the program (Tracey et al., 1995). Trainees' reaction is typically measured as trainee attitudes or reaction toward the content, methodology used and trainers' proficiency; while trainees' degree of learning is measured by improvement in abilities or competency of the learner. Measures of training effectiveness seek to "explicate why training did or did not achieve its intended outcomes" (Kraiger et al., 1993, p. 312). Effectiveness is assessed by identifying and measuring various factors relating to training outcomes and the transfer of training (Tannenbaum, Mathieu, Salas, & Cannon-Bowers, 1991).

In e-learning, while the trainer may still be generating content for training, for it to be made accessible to the learners, it needs to be modified, enhanced and presented in a form that is amenable to the technology that is in use (Lewis, 1971a; 1971b; 1971c;Lockwood, 1994; Riley, 1984; Rowntree, 1994). A proper evaluation of training outcomes is made by measuring changes in job performance and relating it to measurements of achievement of learning goals (Kreiger, Ford, & Salas, 1993). In the current study, employees' perception of e- learning effectiveness is captured from the end users' perspective as a measure of e-learning performance or effectiveness.

2.2.13 Studies related to achievement and satisfaction of learners in e-learning

Researchers have mentioned advantages of e-learning to an organization in several empirical studies of theirs. Due to e-Learning courses' flexibility in time, location, its methods, participation and satisfaction of e- Learning, learners are facilitated (Arbaugh, 2002; Arbaugh, 2000; Berger, 1999; Leidner&Jarvenpaa, 1995). In Kirkpatrick's training evaluation model, trainee's reaction was proposed as one of the outcomes which implies trainee's satisfaction with, or enjoyment of, the program. Satisfaction is one of the major factors used to evaluate e-learning courses, along with cost efficiency and learning resources (Waight& Stewart, 2005a).

Trainees' satisfaction can be represented by three main components: expectation, desire, and perception according to Tannenbaum, et al., (1991). For example, unmet expectation about one's training may lead to low training transfer [Hicks and Klimoski, 1987; and Tannenbaum, et al., 1991]. Hence e-Learning achievement and satisfaction is studied as one of the training outcomes in the current study. In a recent study by Keller (2008) research results supported that user satisfaction of e-learning is one of the incentives for e-learning. Roca et al. (2006) also discovered through a research of employee e-learning that increase of user satisfaction will positively influence employee's intention to continue using the e-learning system and thence learning performance. "A change in individual performance is defined as a result of learning being applied to the job. In turn, results at the organizational level are seen as a direct consequence of change in individual performance" (Yamnill & McLean, 2001). Therefore trainees' sense of achievement and satisfaction in the context of e-learning is taken as a measure of e-learning effectiveness.

2.2.14 Studies related to learning transfer in e-learning

Ultimate proof of a successful training is its conversion and impact on both individual and organizational performance. Several theories (e.g., expectancy, equity, and goal-setting) have been used to interpret behaviors that contribute to performance at work and to explain motivation to transfer. Influencing factors on training transfer have been studied and their measurement constructs have been developed. Noe and Schmitt [1986] identified that job involvement and career planning are influential on training transfer. Tannenbaum, et al. [1991] pointed out that a trainee's job attitude which is positive could lead to better transfer of learning to job performance. According to Alliger, et al., (1997), training transfer can be observed sometime after training by on-the-job performance with new skills/behavior/attitudes learned. In some studies, transfer design, which implies whether trainees have the opportunity to practice learned skills in a job context, was also found influential on training transfer [in researches conducted based on empirical studies by Werner, et al., 1994; Wexley and Baldwin, 1986].

Holton (1996) has proposed a training transfer model which includes three primary outcomes of training: Motivation and ability of the trainee (motivation to transfer), relevance of the training to the needs of the trainee and the organization (transfer design), and the receptivity of the workplace organization to the transfer of the learning (transfer climate).This model is applicable in the context of e-learning and hence, e-learning transfer of the employees has been considered as an influencing factor of e-learning effectiveness in the current study.

2.2.15 Factors contributing to e-learning effectiveness

An appropriate evaluation to measure training outcomes can be constructed by measuring relationships between learning goals achievement and behavior change on the job (Kraiger, 1993). A training intervention introduced into an organization must improve the performance of the trainee. As 'effective' is defined as 'producing a desired or intended result' (*Oxford English Dictionary of Current English*, 2007), the concept of effectiveness implies that there is a desired outcome related to an activity. "Trainees in charge must perform training program and transfer new knowledge, skills and behavior learned during training" (Lim etal, 2007). Thence ***e-learning***

achievement and satisfaction, e-learning transfer and perceived e-learning effectiveness are taken as factors that have an impact on e-learning effectiveness in the current study.

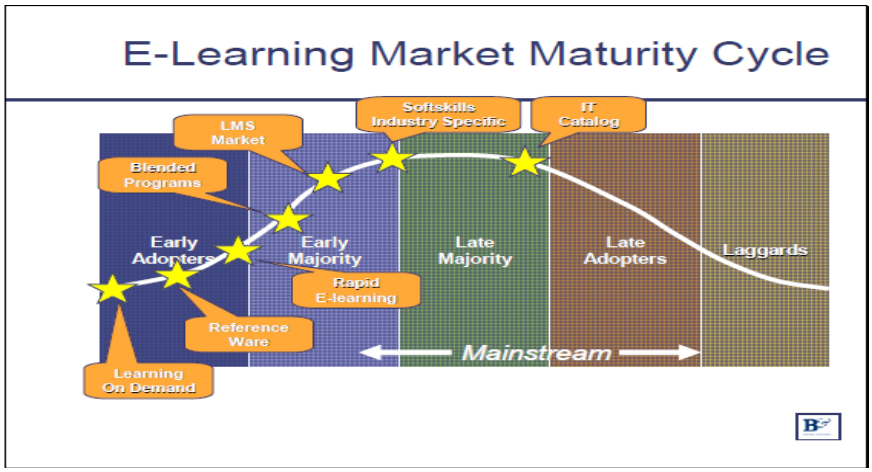
Morss (1999) found empirical evidence that students who had more experience of the technology used a learning management system (Web CT) more than students with less experience of IT. Hence along with demographic variables the research study also included number of online courses taken by users. Prior exposure to e-learning is also included as a parameter in the current study.

2.3 E-learning Maturity Level

It has been commonly observed that domestic enterprises are less proactive than foreign enterprises in application of e-learning. Barriers as assumed by experts include lack of professionals in e-learning, inability to estimate learning performance, no long term introduction plan and budget constraints for introduction. For some organizations even if they intend to introduce e-learning, there could be lack of a complete framework to ensure the benefits of e-learning in corporate training and lack of understanding of which important factors have an effect on employees' e-learning effectiveness.

When it comes to different components of an eLearning solution each component is at a different stage of maturity according to Bersin's Report. Figure 2.7 depicts e-learning market maturity cycle.

Figure 2.7 E-learning market maturity cycle



Source: Bersin and Associates 2004

The market maturity curve shows that when the technology is new there are very few early adopters, as the technology gets established more conservative companies start adopting it. The maturity in the figure curve shows where different e-learning solutions fit today. Table 2.2 describes the characteristics of various organizations in the maturity curve.

Table 2.2 E-learning market maturity characteristics

Organization fit in e-learning adoption	Characteristics of organizations
Early Adopters	• Companies are eager to innovate • Willing to use technology to gain a competitive advantage • Have it staff, management, and executives who are used to doing Things new and differently
Early majority companies	• Will adopt new approaches to stay • Ahead of the market, but tend to wait until there are some reference customers to learn from.
Late majority companies	• Like to wait until all the bugs are worked out • They want to be fast followers
Late Adopters	• Who tend to show up late • Sometimes disorganized, distracted, or perhaps busy with other critical business issues
Laggards	• Wait until the market is almost over and then jump in

Source: Bersin and Associates 2004

After interviewing hundreds of training managers a maturity model for online corporate training has been developed by Josh Bersin, 2004. The current study aims at identifying the maturity level of organizations in India across different sectors. In the first stage of e-learning it is said that the company is in their first or second year of their e-learning program, focused on rolling out off the shelf content and saving money and instructor time, it is typically in the first stage of e-learning. It also does not have enterprise wide LMS and do not have content library yet. The company also

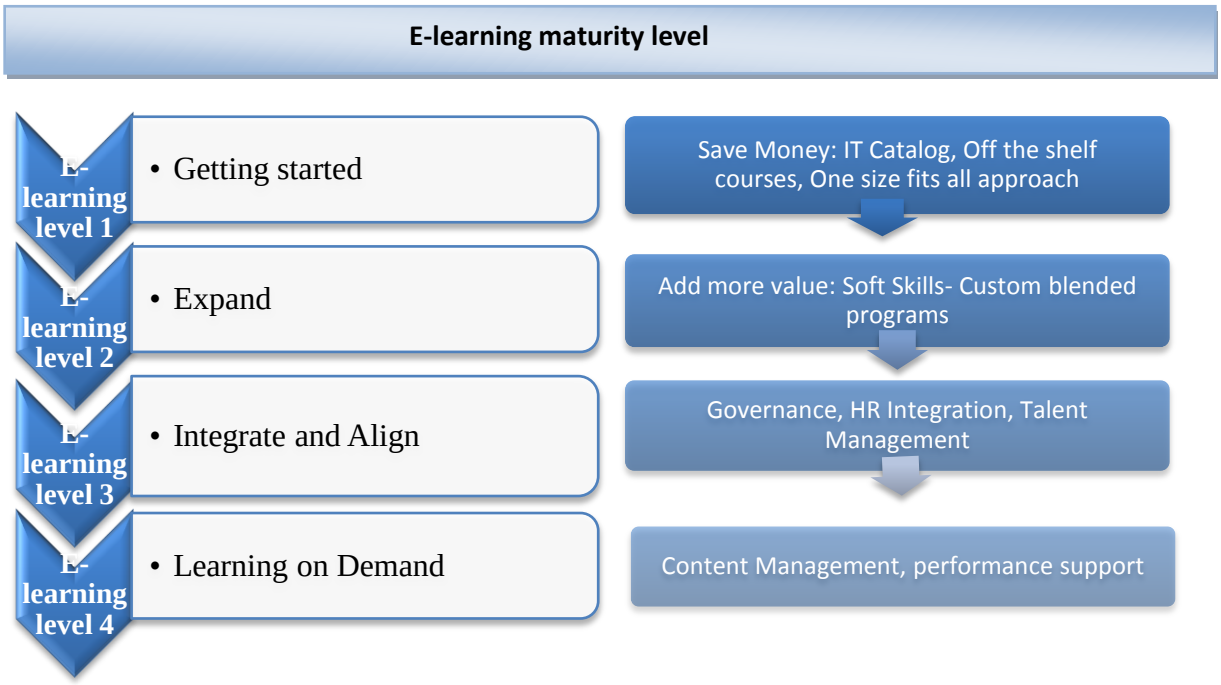
may not have methodology to decide when to use live vs self study options, while still grappling with issues of culture and adoption of e-learning

In the second stage of e-learning, a company would have rolled out many off the shelf courses, has a library online and has some type of LMS although, not deployed enterprise wide. There are still some pockets who have not taken to e-learning and repeatedly received request for custom content and hence it starts either building or outsourcing content. E-learning is now a fixed cost and starts experimenting with blended approaches.

In the third stage of e-learning, e-learning is now integrated both with existing technology and processes of organization. It is aligned with the business results of the organization, and is looked at as a business performance improvement tool. The company now starts measuring e-learning effectiveness and no longer e-learning adoption.

In the fourth stage of e-learning it's basically the concept of learning on demand. They make all instructor led programs blended in some way, higher adoption of webcasting technology, explosion in power point driven rapid e-learning, emergence of LCMS (Learning content management system), evolution of simulation tools easier to use and evolution of analytics systems to make e-learning solutions more scalable, easy to deploy, measure and manage. By now the company has EPSS system, FAQ database, online references (books), event replay (video or audios), web based courseware, instructor led programs, online lab or simulations, a collection of all this information where they try and make it easier to find and use.

Figure 2.8 The four Stages of e-Learning Adoption



2.4 Research Gap and Need Identification

Organizations have taken to e-learning to better manage their knowledge workers with the advent of information technology and internet; however the question lies in the effectiveness of the training offered. In the case of US companies, only 10–15% of training is applied to work (Sevilla& Wells, 1988). Corporate e-learning has become lately the interest of many organizations, both in the supplier and customer side. Its promising role in the upcoming "knowledge revolution" and its position in the training market certainly calls for careful decisions both in terms if adoption and its sustenance in long term.

"ICT implementation often takes place without a theory and many institutions do not spend any resources on trying to understand what kind of changes ICT and computers bring into their system; they just follow the new trend, casting doubt on the success and cost effectiveness of such initiatives" according to Greenhalgh (mentioned in Masiello, Ramberge and Kirsti, 2005). "Program evaluation is rarely planned and when it is, companies do not know what to measure and how to use this information." (Moller, Foshay, &Huett, 2008). E-learning research and practice face inherent challenges. "We need to fully understand the benefits and limitations of

implementing e-learning, in relation to costs and learning effectiveness, and the potential impact on access and the ability to improve or worsen the digital divide" (Rosenblit&Gros, 2011). The most significant problem is that there is no clear definition of how to define e-learning effectiveness. This research study attempts to provide an understanding of contributing factors of e-learning effectiveness.

No published empirical studies have examined prediction of participation in completely technology-mediated training available during work hours, although reports in the trade press suggest that support is essential (Sloman, 2002). Several studies were conducted only to investigate a particular tool of e-learning like a blackboard systems, LMS, moodleetc as mentioned by Shu-Sheng Liaw (2007). Some studies analyze only trainee's characteristics and devote much less attention to organizational influences

There a few comprehensive models of training. For example, Kirkpatrick [1994] developed a well-known and widely used four-level training evaluation model. Noe [1986] also proposed an integrated model of motivational influences on training effectiveness. Baldwin and Ford [1988] then built a model of training transfer. Based on the Kirkpatrick's model, Holton [1996] produced an enhanced three-level training evaluation model. More recently, a number of refined models emerged, based mostly on the previously built models [Alvarez, et al., 2004; Kraiger, 2002; and Noe and Colquitt, 2002]. Though these models provide invaluable insight on ICT training, but then IT-related characteristics such as IT acceptance and usefulness are not considered.

It is essential, therefore, to develop a holistic model of IT training along with its determinants.. It is essential first to identify the factors that influence IT training and, second, to explore how these factors can result into better training outcomes. Such research work can provide us with insights that can enable training practitioners to deliver effective training programs that motivate trainees, promote training transfer, improve individual performance and ultimately improve organizational performance.

After a complete review of literature associated with e-learning in organizations, DeRouin et al. (2005) pointed out that previous studies have not fully supported the positive relationship between e-learning and learning effectiveness. They also emphasized that an explorative study is required to identify important moderators between e-learning and e-learning effectiveness.

Use of ICT in education has been extensively studied by many researchers in terms of factors that influence the likelihood of implementation success for innovative technologies in an educational setting (e.g., Brett &Nagra, 2005; Cheung & Huang, 2005; Collis, Oscar, & Pals, 2001;; Goodyear, Jones, Asensio, Hodgson, & Steeples, 2005; Granger et al., 2002; Ma, Anderssonw, &Streithw, 2005; Masiello, Ramberg, &Lonka, 2005; Selim, 2003). Studies on e-learning in a corporate set-up are very limited internationally. There have been no such studies conducted in India which were cited in literature. Though Indian e-learning market has seen a promising growth in the recent years both in education sector and corporate, empirical studies on corporate e-learning have not been conducted.

There have been several advancements in technology in the last few decades and electronic enabled training system has been strengthened by a variety of technologies. The next chapter provides an overview of various significant aspects of e-learning in a holistic perspective.

CHAPTER III

ADVANCES IN TECHNOLOGY ENABLED TRAINING

CHAPTER 3

ADVANCES IN TECHNOLOGY ENABLED TRAINING

This chapter aims at giving a holistic understanding of technology enabled training and advances witnessed in the domain. Following sections present a brief overview of electronic enabled training systems, its features and various technology solutions supporting e-learning implementation.

3.1 Concept and definition of EETS (Electronic enabled training systems)

"An interactive learning experience between a learner and a computer in which the computer provides the majority of the stimulus, the learner responds, and the computer analyses the response and provides feedback to the learner", said Gloria Gery in 1991, demonstrating the importance of learning experience.

E-Learning, once considered a supplementary process, is now high on the strategic list of the corporate training. The term 'electronic Enabled Training System' (EETS) is applied to training that is undertaken using computer and/ or communication technologies to enable learning to take place. It covers wide range of training and learning experiences: from using a standalone simple personal computer to using the latest multimedia technology; from learning in a lab at a time convenient to oneself to learning through internet at several geographically dispersed locations simultaneously; from video conferencing to getting tutor support through email etc.

Both training and computer industries have been experimenting with computers as learning tools right from the time the computers became commercially available in 1960s. The attempts of using the computer as learning/ training tool were not well received in the beginning as programmers did not have necessary training skills to produce good training material and the trainers did not understand computers enough. Electronic enabled training, EET has progressed a long way since 1960s. Technological improvements have witnessed a convergence of computers with video that has been followed quickly by multimedia. The combination of communications, computers and video is offering great potential for training and will continue to do so in future too.

Another major change evident amongst the 21st century learners is the transfer of the responsibility for learning to the individual and concept of lifelong learning. Today the learners are the drivers for acquiring new knowledge. EET is an umbrella term that describes training or learning which is undertaken using computer or communication technologies to enable learning to take place. It facilitates learning anytime anywhere which could be engaging, also helping to customize learning for various learners.

E-learning today includes CBT (Computer based training), WBT (Web based training), interactive multimedia, electronic performance support systems, LMS and LCMS and online training.

3.1.1 Computer-based training

Computer-based training (CBT) is any course of instruction that uses computer as a means of delivery. A CBT course is offered through a software product installed on a single computer, through a corporate or educational intranet. CBT can be used to teach almost any feasible subject, but its usage for computer-related studies is more rampant. Another advantage to CBTs is its distribution capability to a larger audience relatively low cost once the software development is completed.

3.1.2 Web based training

Web Based Training is learning facilitated and supported through the use of information and communications technology. WBT encompasses a wide range of activities from supported learning, to blended learning (the combination of traditional and e-learning practices), to an entirely online learning. It includes the delivery of content via Internet, intranet/extranet, audio and videotape, satellite, and CD-ROM. However, many organizations only consider it as a network-enabled transfer of skills and knowledge

3.1.3 Interactive Multimedia

Interactive multimedia is a package of materials that includes some combination of texts, graphics, still images, animation, video and audio. These materials are packaged, integrated, and linked together in some way that offers users the ability to browse, navigate and analyze the material through searching and indexing features as well as capacity to personalize these materials.

3.1.4 Electronic performance support systems

Advantages of the electronic performance support systems are that they can extensively help in cost cutting in training expenditure and can enhance performance of the workforce whilst increasing the productivity. It can facilitate employees to access and use e-learning applications with a minimal amount of training. EPSS should be considered as an option to augment knowledge acquisition of employees and improve their individual performance in a competitive business environment. It is also extensively used when skilled performers spend a lot of time helping less skilled performers; when new workers must begin to perform immediately and training is impractical, unavailable or constrained; or when employees need to be guided through a complex process or task that cannot be memorized. These situations often occur when new systems are introduced, upgraded or consolidated, and in certain call centers when agents must perform using complex systems, processes or products.

There are multiple opinions and views about the components and characteristics of EPSS. For example, from Barker and Banerji's (1995) point of view, "An EPSS has four functional levels, which should be brought together successfully. The first level is the user interface shell (the human computer interface) and the database; the second one is generic tools (help system, documentation, text retrieval system, intelligent agents, tutoring facility, simulation tools and communication resources); the third one is application-specific support tools; and the final level is a target application domain (schools, particular business settings, military, etc.)."

They bring to education and training, the extraordinary storage and delivery capabilities of computerized material, is a powerful and efficient source for acquiring learning resources.

3.1.5 LMS and LCMS as part of E-learning

An LMS essentially helps manage an organization's e-learning activities. Any activity ranging from an instructor-led classroom training to educational seminars to Web-based online training can be managed by the LMS. It provides access to online courses for which the user registers. Administratively, an LMS makes it easy to enter, track, manage, and report on learning activities and competencies in an organization. In essence, an LMS primarily focuses on competencies, learning activities, and the logistics of delivering learning activities. Creation of the content is not

part of LMS's functionality and similarly aspects related to improvement and management of the content are also functions not feasible through an LMS.

Learning content management system has the ability to create, reuse, locate, deliver, manage, and improve learning content. An LCMS may identify, locate and deliver a learning object to the end-user as an individual unit to satisfy a job-specific need. It can also offer the required learning object as part of a larger unit like a course, curriculum, or learning activity defined in an LMS.

An advanced LCMS tracks the user's interactions with each learning object and uses this detailed information to deliver highly personalized learning experiences while providing authors with rich reports for analyzing the clarity, relevance, and effectiveness of content, so it can be improved on an ongoing basis. In certain cases, it is also used to promote online knowledge communities and captures the informal, tacit knowledge around the learning object and stores it in a tangible and usable form.

3.2 Drivers of electronic enabled training

Several factors play a key role in promoting electronic enabled training, some of them are knowledge explosion, just-in-time learning, globalization

3.2.1 Knowledge explosion

Knowledge explosion is one of the key factors to fuel electronic enabled training. Knowledge is increasing at a geometrical rate. In "Future Shock" by Alvin Toffler, he quotes…"Future shock is the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time." He says "millions of ordinary, psychologically normal people will face an abrupt collision with the future. We live in much greater stress and anxiety because of the exponential rate of change that is accelerating in our world. We are living in exponential times. The world's knowledge is increasing at exponential rates, as is our technology". There are 3,000 new books published every single day. We've gone from information overload to information

explosion. At this exponential rate of knowledge growth, it's EETS which can deliver updated knowledge at a required pace.

3. 2. 2 Just-in-time learning

"Just-in-Time" (JIT) is a pedagogical shift towards problem and competence-based learning environments. It's a holistic approach that involves new pedagogical strategies, processes, people and systems to deliver knowledge and skills required by academia and organizations, in a timely and cost-effective manner. JIT requires a well-knit assemblage of atomic learning assets and runtime creation of coherent learning content that's aligned to learner's needs and preferences

Delivering information, just enough information (since there's already too much of it), just in time when needed, before it becomes outdated, is mission critical to any business. The performance of a learner on job can be improved by access to the right information, just in time without being overloaded with irrelevant facts and figures. The focus today is on those nuggets of information which reaches the learner when needed to perform a specific task and solve the problems as they crop up.

Chandler and Sweller (1992) succinctly define worked examples as "a problem statement and the appropriate steps to solution, which could provide on the job training required at the right time.

3.2.3 Globalization

With the convergence of computer and communication technologies, globalization of knowledge and information is taking place. The local products and services have a global access and market. In other words, resources and services of one digital library are available to global information seekers via the Internet. When all the digital libraries become accessible via the Internet, it becomes a multimedia virtual library.

Similarly international collaboration is now possible via the Web. The Web-based resources and services can be shared by the partners by adopting suitable policies and strategies. Digital

resources and services are critical to the success of e-learning and knowledge management. Hence efforts are made to develop digital libraries across frontiers.

3.2.4 Scalability

The expansive growth of the Internet has given rise to a more effective and interactive collaborative e-Learning (eL) webcasting. Applications of such kind permit people from different geographical locations to collaborate, communicate and interact during a learning activity using internet. The increasing multimedia processing capability of mobile devices such as Personal Digital Assistants (PDA), Pocket PCs, and Smart Phones as well as advances in wired and wireless networks in terms of multimedia delivery have revolutionized the way in which people collaborate.

Scalability of e-learning would facilitate and promote conduction of training an easy, quick fashion compared to the existing conventional training programs in the organizations. It can be scaled up to meet the numbers involved, this would give a great advantage to organizations in both cost cutting and reaching out to learners who participate. Training any number of employees would involve the same resources as training a much lesser number of employees. It permits training solutions to grow with a company while remaining highly cost effective.

3.3 Technological advancements and their application in IT industry:

Competition in business terrain today, is acutely fierce. The war for global talent, their effective deployment and retention, is the key success differentiator in businesses. Grow more global professional leaders faster than competition is the mantra. In this context, effective learning interventions and pedagogy, that is scalable; portable across geographies; lean on resource and infrastructure; and flexible to meet dynamic demands of industry assumes paramount importance.

There has been a lot of advancement in technology. In the last decade a few of the learning advancements that we get to see are:

- Migration from an overhead projector and transparencies to the usage of a PC with PowerPoint with an LCD projector

- Evolution from CBT (computer-based training) courses which were recored and played from CD ROMs to WBT (web-based training) courses using internet
- Alternatives to classroom-based instruction such as synchronous and asynchronous training courses via web technologies
- Course management systems like LMS (Learning management systems) and LCMS (Learning content management systems) used to to deliver and track training of all types
- Transition from "Web 1.0" – consumption only internet – to the more recent Web 2.0 an internet full of two-way interaction and sharing
- Integration of social media into the learning environment
- Introduction to more advanced mobile devices like iPhone, iPad, other smart phones and tablets and developing applications to integrate learning modules into these devices

The bottom line remains that we need to make our technology strategy fit target audience and instructional goals – not the other way around.

3.3.1 Technology solutions supporting e-learning

There are several technologies which aid in electronic enabled training:

(a) Video conferencing: A combination of ISDN lines (integrated digital networks) and a camera are used to film the instructor and projected to participants sitting at a different location, through a modem. It can simulate classroom environment, incorporate a variety of media, ensure constant delivery of content, providing immediate feedback and eliminating travel cost.

(b) Digital collaborative tools: Digital whiteboard is an area provided on a display screen that users can write or draw on, it can be used by multiple users. Whiteboards have acquired significance in teleconferencing applications as they facilitate both visual and audio based communication. It comes with many advantages like giving an accurate record of all that was discussed in a meeting immediately after adjourning. Discussion forums, emails etc are also extensively used as collaboration tools.

(c) Teleconferencing: To hold a conference via a telephone or network connection.

(d) Virtual classrooms: Virtual classrooms have come to provide a plethora of advantages for geographically distributed participants to be able to undergo training in an interactive mode. A virtual classroom allows learners and trainers to attend live training session from any place in the world, provided they have a computer and Internet connection. A virtual classroom has a facility to record the session so learners or teachers can replay it afterwards.

(e) Chat Rooms: Text based chat encourages interaction between participants and instructors in a live session, especially when only one way audio is available. Thus, it creates a platform for direct interaction and immediate feedback.

(f) Business Television: Business television is the production and distribution , via satellite, of video programs for closed user group audiences. This enables immediate delivery of time critical messages, cost effective way of attending seminars and conferences. The format allows interaction with presenters by telephone, speed of transmission is a competitive edge.

(g) Webinars: Short for ***Web***-based sem***inar***, a presentation, lecture, workshop or seminar that is transmitted over the Web .A key feature of a Webinar is its interactive elements -- the ability to give, receive and discuss information. Contrast with Webcast, in which the data transmission is one way and does not allow interaction between the presenter and the audience. Webinars help reach a much targeted audience, either live or on demand, quickly and efficiently. Webinars have been widely used in corporate segment for various reasons. They engage participants through the use of video, audio, slides and interactive options. They achieve greater reach at a generally lower cost than face-to-face meetings. Live webinars can be re-broadcast as on-demand versions, thus enabling knowledge-sharing and optimum utilization of interesting content. A webinar can be viewed on a PC, Mac, tablet or smartphone and is a 'Green' communications tool: by reducing travel for both presenters and participants.

(h) Smart class: A smart classroom is a classroom that is equipped with computer and audiovisual equipment, allowing the trainer to teach using a wide variety of media. Smart

classroom includes a PC with internet access, DVD, speakers, Laptop Connections for Guest Speakers, LCD Projector and projector Screen.

(i) Weblogs: A weblog can be loosely defined as a journal or diary which is published on the World Wide Web. The process of updating and maintaining a weblog is known as blogging and the author is known as a blogger. Weblogs are usually updated at regular intervals using user-friendly software that requires little or no technical background. This feature enables knowledge sharing in an effortless way.

(j) Web conferencing: Web conferencing systems allow participants to communicate in real time with simply a personal computer, an Internet connection, and optional microphone and Web camera (webcam). These systems can accommodate both synchronous and asynchronous communication and can create powerful virtual learning environments that closely approximate face-to-face experiences (Foreman and Jenkins 2005). Web conferencing, a technology once available only to companies with larger budgets, is now becoming more main stream due to advances in technology and fierce market competition. In all educational settings (face-to-face, hybrid, and distance learning), this technology has the potential to engage learners and improve learning. Participants can access and attend these online meetings through a standard Internet browser (although some Web conferencing software also requires participants to download plug-ins before they can access the meeting).

(k) Podcasting: Podcasting is a means of publishing audio and video content on the web as a series of episodes with a common theme. These episodes are accompanied by a file called a "feed" that allows listeners to subscribe to the series and receive new episodes automatically. The audio/video file and RSS feed are then posted to a Web server. For the first podcast in a series, and for ongoing series that are always open to new subscribers, the podcast creator must notify the audience of the existence of the podcast by publicizing the location of the RSS feed.

(l) M-learning: Mobile devices are becoming ubiquitous, and mobile learning is increasingly an option. The important issues are to understand the basic value-proposition mobile offers, and then to consider the opportunities unique to mobile. Whether looking at media files, audio, or video when convenient, or accessing information from documents or Web pages, the availability of the information when and where desired has immediate benefits. Similarly, being able to communicate with anyone, by voice, text message, or social media platform has equal if not greater benefits. As of yet, the characteristically quick access of these devices as needed is more suited to *in situ* help than it is to large-scale skill development. Mobile learning means both augmenting formal learning, and moving to performance support, informal, and social learning as well. The actual implementation of mLearning is growing faster in some capabilities than others.

(m) Social networking: Social media in the form of collaborative (Web 2.0) and semantic (Web 3.0) webs portray attributes of Gibson's concept of affordances. Some examples include tools that provide access to resources such as information (Google) or people (Facebook); of declaring or stating presence (most instant messenger status); of expression (Second Life); of creating new content and resources (blogs, wikis, and podcasts); of interaction with others (twitter, skype); and of aggregation of resources (RSS feeds). These functions, or affordances now inform how content should be delivered and how older forms of content delivery described earlier should be reconstructed if they are to remain relevant.

(n) Simulations: Use of computer based management simulations has been in vogue for 40 years now. Several studies and surveys have been mentioned in literature that entailed various aspects of effectiveness of management simulations. Hemmasi and Graf assessed the educational value of simulating games in business policy courses. Kaufman, Wolfe, Norris and Snyder have studied the correlation between previous work experience and their performance in simulation games and that of alumni career success. Computer based simulations are advantageous when compared to conventional classroom teaching in providing hands on experience and serving as a platform to team heterogeneous learners.

(o) Web 2.0 (the participative web): "Web 2.0 is the business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the

rules for success on that new platform" Tim O'Reilly (2006-12-10). Allow users to do more than retrieve information. It supports the concept of Network as platform, allowing users to run software applications entirely through a browser. Various features of Web 2.0 include rich Internet Application techniques, Weblog publishing, Wiki or Forum and Social Networking

3.3.2 Application of right mix of technologies in the industry for training e-learning

Technology is always the backbone when developing e-learning content. With advances in technology, learners can now view learning content as mentioned in the chapter above. Media type also could vary from graphics to audio to video or animation – which in combination with text. With so many options available to choose between the technologies, there is every chance to use multiple types of media but which do not contribute to a good learning experience.

It is important to choose the right type of media which is appropriate that fits into the entire course ware enhancing learning experience. So finding the right the right mix of media is then an important task for developers and for the organizations who offer training through e-learning. Research Methodology of the current study is explained in the next chapter.

CHAPTER IV

RESEARCH METHODOLOGY

CHAPTER 4

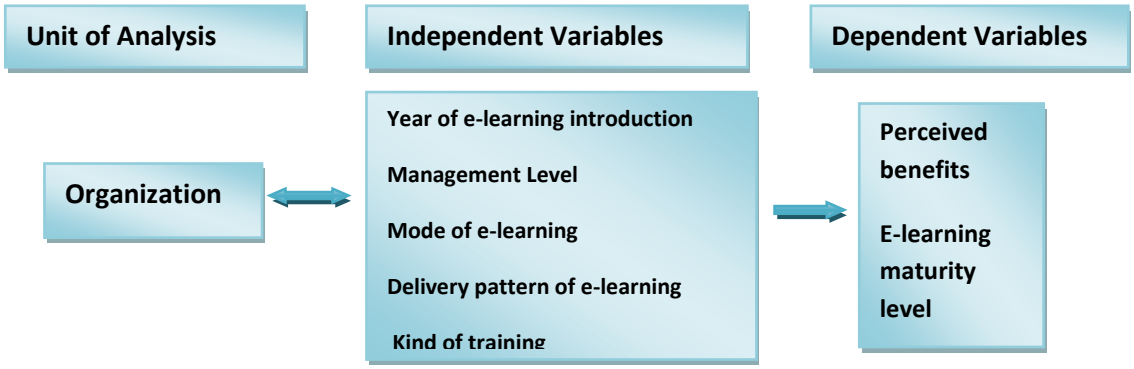
RESEARCH METHODOLOGY

Review of literature reveals e-learning concepts studied in isolation, lacking a holistic perspective. Empirical studies investigating the impact of demographics on e-learning factors are nearly absent in the Indian context. However the review of literature has helped in arriving at a conceptual framework to guide the empirical investigation. This chapter aims at giving a brief description and representation of conceptual framework used in the current study. Research questions, Objectives of the Study and Scope of the study along with the results of Pilot Study describing the Validity and Reliability of the Survey used in the study are also presented. Further, the research design covering Survey Design, Study Period, Sample Size, Proposed and Actual sample, tools and techniques used in data analysis are also included. Limitations of the Study along with the chapterization scheme are presented at the end.

4.1 Conceptual Framework of the Study

The Study was done at *two levels*. At the first level, a study has been conducted with organizations using e-learning across various industry sectors in India. As presented in Figure 3.1, the unit of analysis for the research is taken as the organization. The independent and dependent variables included the facts of the organization and related factors. This model provides an insight into various factors related to e-learning in organizations.

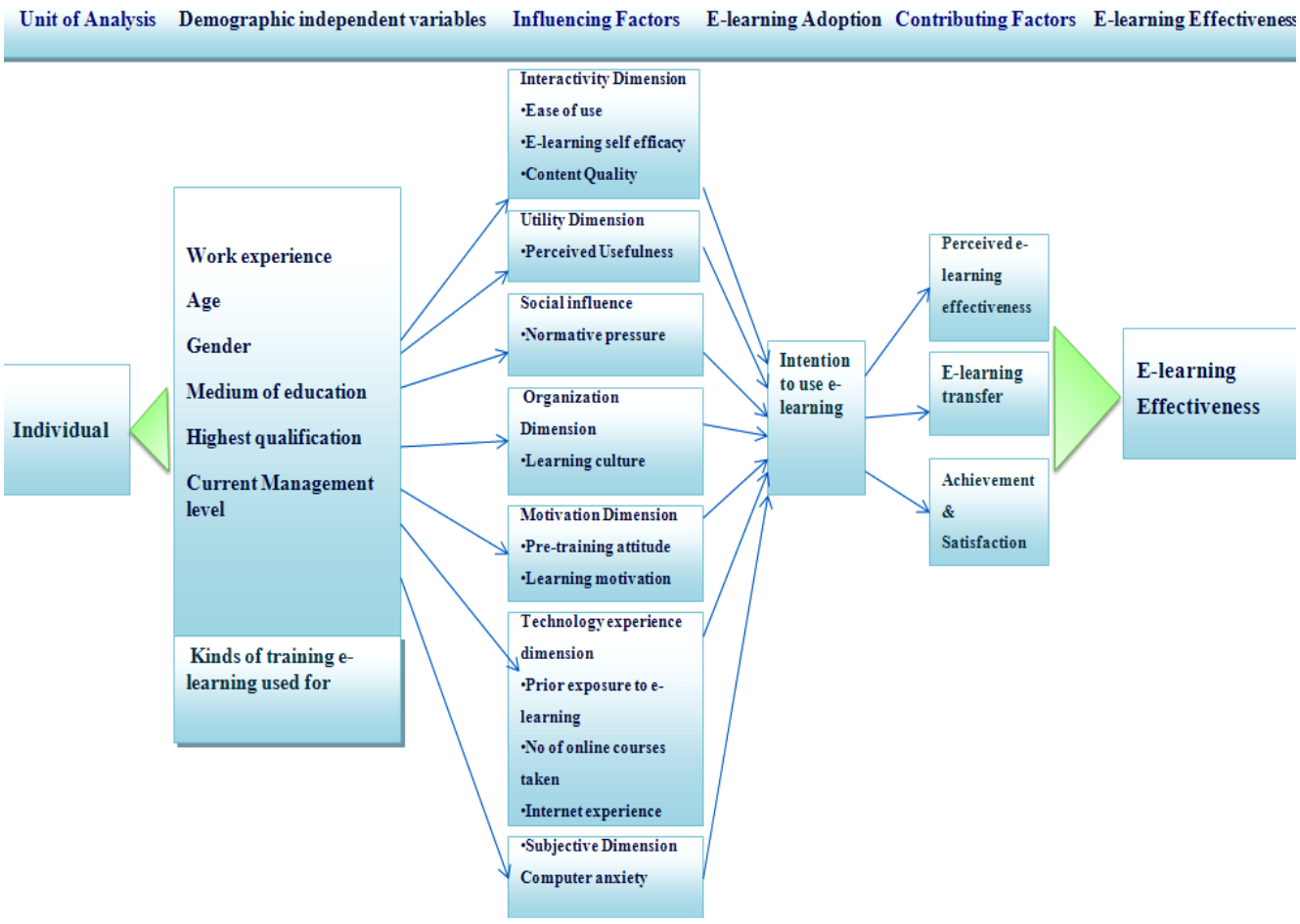
Figure 4.1 Conceptual model of the research study (Organizations)



At the second level, another study has been conducted with the end users of e-learning from the Indian IT Industry. As depicted in figure 4.2, the unit of analysis considered for the research was the individual. The framework enables to comprehend various demographics of IT industry population in relation to their e-learning.

Influencing factors have been identified from various dimensions, such as Interactivity dimension, utility dimension, Social dimension, Organizational dimension, motivational dimension, technology experience dimension and subjective dimension. Similarly contributing factors of e-learning effectiveness have been identified from literature and studied. The conceptual framework thus presented provided a holistic and integrated approach to analyze e-learning adoption and its effectiveness at an individual level.

Figure 4.2 Conceptual model of the research study (Individuals)



4.2 Research Questions

The framework thus provided the platform to analyze various factors related to the study. They also throw a number of research questions that can be explored. They are

- To which management levels do the organizations offer e-learning?
- What is the mode of e-learning and delivery pattern used more frequently in organizations?
- For which kind of training is e-learning more frequently used?
- What are the more popular e-learning tools used?
- What could be the purpose of introducing e-learning in organizations?
- Does the e-learning maturity level of organization depend on its year of e-learning introduction?
- Do the perceived e-learning benefits depend on the mode of e-learning organizations choose?
- How much do the IT professionals adopt e-learning for their training?
- How do they perceive ease of use in relation to e-learning?
- How do the IT professionals perceive content quality of the learning programs provided to them?
- Do the IT professionals perceive e-learning as useful?
- Do the IT professionals get influenced by subjective norms?
- Does the learning culture of the organization make a difference to their e-learning adoption?
- How is the IT professional's pre training motivation?
- Does their learning motivation make a difference to their e-learning adoption?
- Does their prior technology experience have an impact on their e-learning adoption?
- Is there a dependence of demographic profile on all these dimensions of e-learning adoption?
- How do the IT professionals perceive e-learning effectiveness?
- What is the achievement and satisfaction of learners after e-learning experience?
- How much of knowledge acquired is transferred to work?

- Is there a dependence of factors influencing e-learning adoption on factors contributing to e-learning effectiveness?

4.3 Objectives of the study

With the research questions in the back drop, the study thus broadly, focuses on the factors which drive and facilitate the organizations and IT professionals to adopt e-learning. More specifically, the study aims to

- Analyze the year of e-learning introduction, mode, e-learning tools, kinds of training e-learning used for and delivery patterns of e-learning in organizations
- Examine the purpose of introducing e-learning and benefits obtained at the organizational level
- Study the e-learning maturity level of organizations and its dependence on sectors
- Examine the demographic profile of IT professionals and their role on factors that influence e-learning adoption and e-learning effectiveness
- Relationship between the factors affecting e-learning adoption and factors contributing to e-learning effectiveness

4.4 Hypotheses

Several hypotheses were formulated based on the above objectives and are given at the organizational level and individual level separately. They are

Organizational level:

- Hypothesis 1: There exists a relationship between year of e-learning introduction and e-learning maturity level
- Hypothesis 2: There exists a relationship between mode of e-learning vs. purpose of introduction and benefits of e-learning
- Hypothesis 3: There exists a relationship between industry sector and e-learning maturity level

Individual level:

- H4: There exists a relationship between Academic qualifications of end users and factors contributing to e-learning effectiveness
- H5: There exists a relationship between Academic qualifications of end users and factors influencing e-learning adoption
- H6: There exists a relationship between Number of online courses taken by end users and factors contributing to e-learning effectiveness
- H7: There exists a relationship between Number of online courses taken by end users and factors influencing e-learning adoption
- H8: There exists a relationship between age of end users and factors contributing to e-learning effectiveness
- H9: There exists a relationship between age of end users and factors influencing e-learning adoption
- H10: There exists a relationship between level of management of end users and factors contributing to e-learning effectiveness
- H11: There exists a relationship between level of management of end users and factors influencing e-learning adoption
- H12: There exists a relationship between gender of end users and factors contributing to e-learning effectiveness
- H13: There exists a relationship between gender of end users and factors influencing e-learning adoption
- H14: There exists a relationship between prior exposure to e-learning of end users and factors contributing to e-learning effectiveness
- H15: There exists a relationship between prior exposure to e-learning of end users and factors influencing e-learning adoption
- H16: There exists a relationship between medium of education of end users and factors contributing to e-learning effectiveness
- H17: There exists a relationship between medium of education of end users and factors influencing e-learning adoption

4.5 Scope of the study

The Scope of the study included Indian Organizations which implemented e-learning in their training. The organizations were chosen across sectors. For the individual level study, Hyderabad, Delhi, Kolkata, Chennai, Mumbai and Bangalore have emerged as hubs for IT business. IT industries from these areas were chosen for the study. The cities have witnessed extensive investment in digital infrastructure with companies like Infosys, Microsoft, Oracle, Cognizant Technology Solutions, Tata Consultancy Services, Amazon and Google etcsetting up operations. The large concentration of international IT majors in these cities facilitated the choice of these geographical areas. It is decided to select top ten IT Organizations listed according to Gartner, who have subscribed to e-learning as a training intervention. An in-depth study of the selected companies was done to understand and have insights into the e-learning processes and practices. About 300 respondents spanning the select organizations were contacted to throw light on the various facets of the study at the individual level.

4.6 Research design

The study is exploratory in nature and literature evidences very little information on similar subject in the past. Hence, further research is needed to bring about the related aspects of e-learning which is a training intervention much resorted to in the current digitally driven talent economy. Research in the Indian context of e-learning in the IT industry is very limited as the research topic is relatively a new subject. Qualitative data was collected to examine and understand the various dimensions of adoption and effectiveness of e-learning training intervention in IT industry

4.7 Survey design

The survey has been done at two levels. First survey is designed to understand e-learning offered from an *organizational perspective* and second is aimed to understand *end user's perspective* of e-learning. The industry sector chosen for the second survey is *the IT industry*. The first survey was designed with 10 questions- the questionnaire primarily covered the details of organization related

to e-learning training intervention, perceived benefits, purpose behind e-learning introduction in organizations and finally e-learning maturity level. Improved maturity models can be instrumental in turning organizations into learning organizations with self-managed active learning. Maturity model can also be used to link personal development plans with e-learning and hence the questionnaire also focused on e-learning maturity level of organizations. Scaling techniques were used to elicit responses from the training managers or chief learning officers of organizations for the first level questionnaire and employees with more than one year experience and with an e-learning exposure in IT industry. Respondents were asked to rate on a 4 point scale with **1 = Strongly Disagree, 2= Disagree, 3 = Agree, 4 = Strongly Agree.**

The Second questionnaire was *divided into two parts*. The *first part* of the questionnaire covered the demographic details of respondents, which are important to assess various factors related to e-learning adoption and effectiveness .In addition to demographic details, prior exposure to e-learning, number of on-line courses taken by the user, kind of training e-learning used for were questions included to understand their influence on e-learning adoption and effectiveness.

The *Second part* of the questionnaire focused on the various factors influencing e-learning adoption from interactivity dimension of e-learning, from utility dimension, from a social dimension, organizational dimension, motivational dimension, technology experience dimension and from a subjective dimension. The Questionnaire has been designed to address all those factors that are said to influence e-learning adoption in the literature. 6 main questions on self-efficacy, usefulness, ease of use, content quality, learning motivation and learning culture were included to comprehend factors influencing e-learning adoption. The Questionnaire then proceeds to address the factors contributing to e-learning effectiveness. Three factors that have been extensively used to measure e-learning effectiveness in prior research studies have been emphasized to elicit responses from users in the lines of their learning transfer, achievement and satisfaction and finally their perception of e-learning effectiveness as given in Annexure I.

The entire questionnaire was aimed to give an analysis of how knowledge is gained through e-learning, factors influencing adoption of e-learning, how much of it is perceived as relevant and applicable, whether it helps employees to achieve their goals, solve a problem, meet business

needs, employee engagement level after e-learning, the performance results according their perception, retention levels after training intervention, placement of high potentials based on competencies built through training were main areas of focus. Respondents were asked to rate on a 4 point scale with **1 = Strongly Disagree, 2= Disagree, 3 = Agree, 4 = Strongly Agree.**

4. 8 Sample Frame

The first step was to identify the geographical area for the study. Since the study focused on the IT sector, the major IT hubs were identified. Accordingly, the location was selected.

Geographical coverage of respondents in IT industry was from the following cities

- Bangalore
- Chennai
- Delhi & Gurgaon
- Hyderabad
- Mumbai & Pune
- Kolkata

The next step was to identify the organizations and the end users from these locations. The sample was selected using a set criteria. The criteria for selecting the sample is given below:

For the *organizational level questionnaire*:

- Organizations which implemented e-learning were chosen
- HR Managers/ Training heads of the respective organizations identified were chosen as respondents
- Organizations across various industry sectors were chosen.

For the *end user level questionnaire:*

- Respondents were knowledge workers from IT industry
- Respondents who had more than one year of work experience across roles
- Respondents who belonged to three different management levels: operational, middle level or top management level

4.9 Sample Size

The sample was collected following the process below

- In the *first stage*, it was decided to collect a list of companies offering e-learning from each industry sector. The details of HR Heads and training managers were obtained. The available data arrived at a size of 287 companies that satisfied the criteria. In practice there are few companies other than IT, BFSI and Pharma who have adopted e-learning and have embedded into their main stream training. Around 100 responses were targeted.
- In the *second stage*, employees of IT companies chosen from Gartner's Top 10 list were identified. Further came in the other criteria of minimum one year experience and having had an exposure to e-learning. A sample of 1100 was identified and around 400 responses were targeted.
- Thus the response rate of samples are given below in Table 4.1 &4.2:

Table 4.1 Organizational questionnaire Survey Responses	
Number of questionnaires sent	287
Total number of responses received	87
Usable responses	83
Unusable responses	4
Response Rate	30.31 %

Table 4.2 Employee level questionnaire Survey Responses	
Number of questionnaires sent	1100
Total number of responses received	394
Usable responses	389
Unusable responses	5
Response Rate	35.36 %

4.10 Data Collection

Data was collected from both primary and secondary sources. The primary data for the organizational level module was collected through a survey from the organizations across different sectors that have introduced e-learning and implemented them. Primary data for the individual level module was collected through a survey of employees from IT industry. Companies chosen are the ones that are listed in Top 10 list of Gartener. A specifically designed questionnaire was prepared and administered to the target sample in order to elicit both factual and perceptual data on the design, implementation, and application of the different aspects covered in the study.

4.11 Data Analysis

Tool used to mail questionnaires was Google forms. IBM SPSS Statistics 20.0 was used for Data Analysis. Reliability was analyzed by calculating Cronbach's Alpha in SPSS for each group of questions. Frequency was used to analyze the demographic data like year of e-learning introduction, kinds of training e-learning is used for, level of management e-learning is implemented for, e-learning tools and delivery methods used for the organizational questionnaire. At an individual level, demographic data like age, management level they belong to, prior exposure to e-learning, number of online courses taken highest qualification etc.

Scaling techniques were used to analyze the concurrence of end users on questionnaire items. A 4 point scale was used where a rating of above 3 was accepted as an item with more concurrence, 2.5 to 3 as Weak concurrence & 2.5and below as No concurrence.

Factor analysis to narrow down on specific factors was done to group the factors, ANOVA to measure the variance amongst different factors at different hierarchical levels and regression analysis to measure the effect of independent variables identified on the dependent variables were the other tools used in the study. .

4.12 Pilot Study

A pilot study was conducted for each group of questions to test the reliability of the instrument. Cronbach's Alpha was calculated in SPSS for each group of questions based on different influencing factors. The results are given below for each of the dimensions. They are:

0.702 for Self efficacy with 5 items

0.799 for Usefulness with 5 items

0.681 for Ease of use with 6 items

0.759 for Content quality with 5 items

0.764 for Learning motivation with 6 items

0.791 for Learning culture with 9 items

0.719 for Subjective norms with 4 items

0.758 for Training at workplace with 8 items

0.698 for Achievement and satisfaction with 9 items

0.705 for E-learning transfer with 5 items

0.697 for E-learning effectiveness with 8 items

0. 767 for Computer anxiety with 4 items

0.867 for Internet experience with 4 items

The Cronbach Alpha for all the 78 questions together is shown in table 3.3 (Reliability Statistics.)

Table 4.3 - Reliability Statistics

Cronbach's Alpha	N of Items
.836	78

Based on the feedback from Experts, survey questions were re-phrased keeping the same intent as shown in Table 3.2**.**

Table 4.4 Changes in Questionnaire after Pilot Study

Q. Ref.	**Pilot Survey Question**	**Final Survey Question**
8	Scale for the 8th question was Least important, Somewhat important, Important and Most important	Scale for the 8th question was changed to Strongly disagree, Disagree, Agree and Strongly Agree

Q. Ref.	Pilot Survey Question	Final Survey Question
8.1	My employer providing e-learning opportunity to improve my skills is.	My employer providing e-learning opportunity to improve my skills is important
8.2	Rewards and/or recognition from my employer for taking e-learning is	Rewards and/or recognition from my employer for taking e-learning is important
8.3	Having time available on the job for e-learning is	Having time available on the job for e-learning is important
8.4	Having a long-range career goal is	Having a long-range career goal is important
8.5	Contributing to a more highly-skilled workplace is	Contributing to a more highly-skilled workplace is important
8.6	E-learning participation being factored into my performance evaluation is	E-learning participation being factored into my performance evaluation is important
8.7	The concern that my employer may monitor my progress without my knowledge is	The concern that my employer may monitor my progress without my knowledge is important
8.8	Need of training in order to do my job well is	Need of training in order to do my job well is important
9.1	E-learning was useful in helping me develop new ways to achieve	E-learning was useful in helping me develop new ways to achieve and is satisfactory
9.5	Using e-learning is useful as it decreases travel expenses	Using e-learning is useful as it decreases travel expenses and provides ease of access
9.7	I believe e-learning can improve one's information retention	I believe e-learning can improve one's information retention and helps us achieve tasks at work
9.8	I believe e-learning provides ease of access to learning	E-learning helped us acquire intended knowledge, skills and attitudes

4.13 Chapterization Scheme

The study has been organized into six chapters. They are:

Chapter I introduces the background of the study, advent of talent and knowledge economy, growing importance of training for the workforce, development of e-learning as a training medium and the deployment of e-learning in IT industry for training its workforce. The chapter also presents an overview of IT Industry in India, challenges that it faces and a brief description about the pertinent variables which are used in the current research study.

Chapter II examines various e-learning models, factors influencing e-learning effectiveness and adoption. The research gaps are identified towards the end. The review of literature is presented in three sections. First, the models of technology acceptance in e-learning are discussed. This is followed by research review of influencing factors in e-learning. The third section discusses the research gaps identified by the current study.

Chapter III provides latest tools and delivery mechanisms existing in the current scenario. E-learning has evolved in the last few years and more so in the last one year with advancements in web 2.0 and mobile learning. This chapter throws light on those advancements and practices in vogue.

The research methodology was presented in **Chapter IV**. The chapter includes research questions, objectives of the study, scope of the study, assumptions etc. Research design covering Survey Design, Sample Size, tools & techniques for data management and analysis are also included. The limitations of the study and the results of Pilot Study are highlighted along with the validity and Reliability of Survey questionnaire.

Chapter V provided the analysis of data in the form of sections. Section 5**.1** presents analysis to assess the Validity and Reliability of the dimensions. Section **5.2** presents demographic data which includes year of e-learning introduction, mode of e-learning adopted, delivery pattern used, types of training e-learning is used for at organization level **5.3** presents descriptive statistics and analysis of the organizational level questionnaire with hypotheses testing. **Section 5.4** presents

descriptive statistics at organizational level **Section 5.5**. presents demographic data of the individual level responses which includes years of work experience, age, gender, medium of education, academic qualification, management level, number of online courses taken, prior exposure to e-learning, location distribution. **Section 5.6** presents Analysis at organizational level with hypotheses testing using ANOVA, Chi-Square **Section 5.7** presents Analysis at individual level with hypotheses testing using ANOVA, Chi-Square and Regression analysis **Section 5.8** presents Factor analysis.

Chapter VI provides broad conclusions and recommendations arrived at, based on the analysis and inferences. The conclusions and recommendations are presented in this chapter under Demographic Data, Awareness, Objective Wise Conclusions, Implications of the study and broad directions for further research in that order.

The bibliography and annexures are appended at the end. Next chapter describes the data analysis of the study in detail.

CHAPTER V

DATA ANALYSIS

CHAPTER 5

DATA ANALYSIS

Data, in nature of primary was collected from sampled respondents keeping the objectives of study in view. This chapter presents a detailed analysis of the results of the study. Data from the questionnaires were entered into Microsoft Excel sheet and then into SPSS software. Most of the analyses described in this section were done using SPSS software package. Initially the sample characteristics were analyzed. This was followed by a detailed analysis of independent and dependent variables.

A sample of 87 companies across industry sectors have responded for the analysis of e-learning at the organizational level and 389 employees from IT industry have responded for the analysis at an individual level. Initially the data were examined for reliability related concerns including accuracy of data entry, missing values. Out of 87 responses from the organizations, 4 could not be used because of incomplete data. Out of 398 responses from individuals, 9 could not be used because of incomplete data. Results of reliability analysis suggested that the data are reliable.

Data was collected on different dimensions both at organizational and individual level. At the organizational level, it primarily related to about the e-learning maturity level of the organization, purpose and benefits perceived through e-learning. At an individual level the questionnaire explored the interactivity, utility, social, Organizational, motivational, technology experience and subjective dimensions. The perceptual data was collected using a 4 point scale with ratings ranging from 1 to 4 (1 being Strongly Disagree, 2 being Disagree, 3 is Agree and 4 is Strongly Agree) and analyzed using the scores. The pilot test was conducted and analyzed to examine the validity and reliability of data and the instrument. Further, the KMO – Barlett test was conducted to check sample adequacy. Data, thus collected was treated statistically using SPSS and analyzed to arrive at inferences and conclusions, based on which, certain recommendations were made.

The following analyses were used to obtain measures of variables. 1. Reliability assessment using reliability statistics determined by Chronbach's alpha. 2. Frequencies and descriptive statistics of all the demographic variables to understand their nature and range. 3. Variations across the

industry sectors in the deployment of e-learning using ANOVA 4. Relationship between organizational demographic variables and perceived benefits from e-learning using Chi Square Test 5. Correlations among perceived influencing factors of e-learning 6. ANOVA to understand the association of demographic variables on the influencing factors analyzed in the current research study. 7. Chi- Square test to determine the association of a few demographic variables on the factors analyzed in the research study. 7. Exploratory factor analysis of perceived factors influencing e-learning adoption and effectiveness. 8. Regression analysis to understand the relationship between the dependent and independent variables in the study.

The results of data analysis are presented in the following lines

5.1 Validity and Reliability of data

Ensuring validity and reliability of research data is a prerequisite to circumvent possible shortcomings and pitfalls in research results (Ehlers, 2009). Clont (1992) and Seale (1999) endorse the concept of dependability with the concept of consistency or reliability in qualitative research

Patton (2001) states that validity and reliability are two factors which any qualitative researcher should be concerned about, while designing a study, analyzing results and judging the quality of the study. Consistency indicates how well the items measuring a concept hang together as a set and Cronbach's Alpha is a reliability coefficient indicating how well the items in a set are positively correlated to one another.

Cronbach's Alpha is computed in terms of the average inter–correlations among the items measuring the concept. The closer Cronbach's Alpha is to 1, the higher internal consistency reliability (Green and Mulaik, 1977; Hair, 1999).Table 5.1.reports the results of Validity, Reliability and the Cronbach Alpha values for all the questions grouped.

Table 5.1 Reliability measures of variables

Reliability Statistics			
Factors	**Valid cases**	**Cronbach's Alpha**	**N of Items**
Self efficacy	389	0.706	5
Usefulness	389	0.843	5
Ease of use	389	0.701	6
Content quality	389	0.818	5
Learning motivation	389	0.781	6
Learning culture	389	0.810	9
Achievement &satisfaction	389	0.774	9
E-learning transfer	389	0.781	5
E-learning effectiveness	389	0.702	8
Subjective norms	389	0.749	4
Training at workplace	389	0.766	8
Computer anxiety	389	0.782	4
Internet experience	389	0.910	4
OVER ALL		0.930	78

Table 5.2 depicts the overall Cronbach alpha value for all the variables put together.

Table 5.2 Cumulative Reliability measures of variables

Reliability Statistics for the variables		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.930	**.934**	**78**

As can be seen from table 5.1, each of the dimensions under the study has high Cronbach Alpha, which indicates that they are valid and reliable. It is interesting to see values for content quality, usefulness and learning culture that are higher in their cronbach alpha vales as compared to the other factors studied. It represents the robustness of these factors. An overall reliability value of .930 indicates that it satisfactorily meets the requirement of reliability.

5.2 Demographics: Organization level responses

The analysis was done at two levels, namely organizational level and individual level. At an organizational level demographics surveyed were: Name of the company, year of e-learning introduction, Management level to which e-learning was offered in their organization, mode of e-learning used, e-learning tools implemented, e-learning delivery mechanism used, type of training e-learning is used for frequencies of e-learning maturity level of organizations.

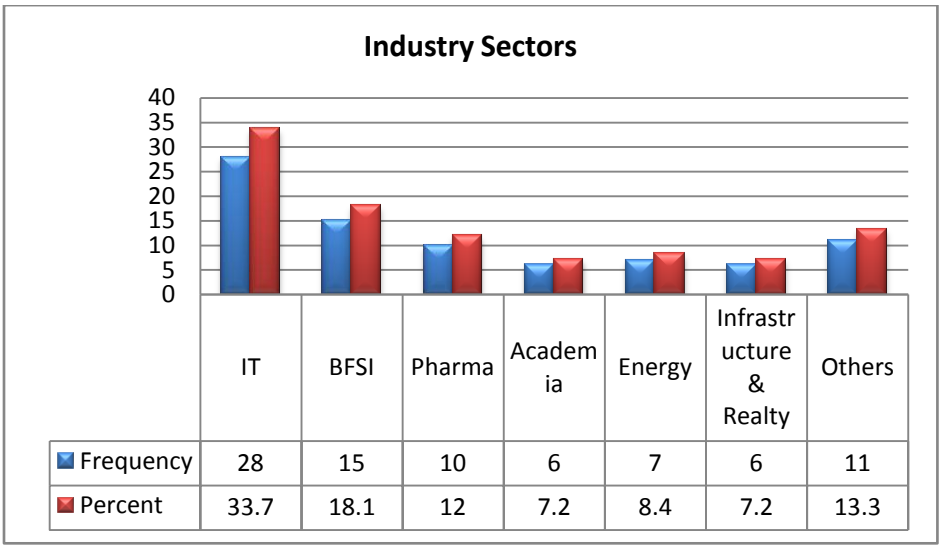
5.2.1 Industry sector of organizations

The organizations responded have been classified into IT, BFSI (Banking Financial services and Insurance), Pharmaceutical (also includes organizations belonging to Life Sciences), Academia, Energy (which included Petroleum, oil and gas), Infrastructure & Realty and others which include Food, textile, transport services, automotive, retail and consultancy firms. The grouping was done on the basis of International Standard Industrial Classification of All Economic Activities.

Figure 5.1 depicts the industry sector of organizations responded. From the organizations that responded, majority of them belong to Information Technology sector, next leading is BFSI,

followed by pharmaceutical industry. Academia, Energy sector and Infrastructure and Realty stand next. The data clearly shows that IT has adopted e-learning more readily than any other sector for reasons like availability of infrastructure and tech-savvy workforce.

Figure 5.1 Industry sectors of organizations

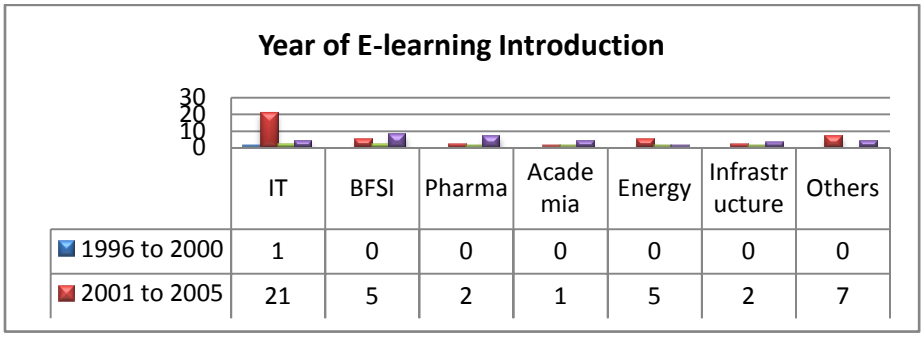


BFSI and Pharmaceutical sector are also embracing the technology driven training, the e-learning. Most of the companies belonging to the others category are yet to embark on the path of adopting e-learning.

5.2.2 Year of e-learning introduction

Figure 5.2 explains the distribution of organizations according to the year of e-learning introduction. Majority of the organizations, where most of them are from IT sector have introduced e-learning in their organizations between the years 2001 and 2005. Years between 2011 and 2015 have again witnessed a surge in terms of adopting e-learning, while the range of years between 1996 and 2000 almost do not have any of them taking to e-learning, 2006-2010 witnessed a few organizations that have introduced e-learning into their main stream training.

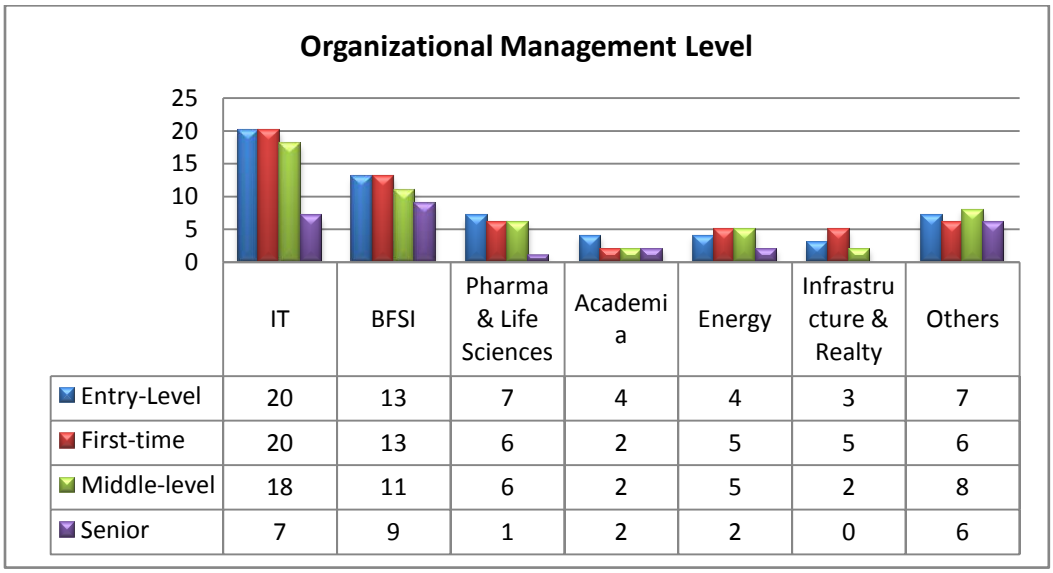
Figure 5.2 Year of E-learning Introduction



5.2.3 Management level

Figure 5.3 represents the management levels that e-learning is offered to according to the organizations that have responded. The responses indicate that e-learning offered to senior level management is limited. This trend is exhibited more in the IT industry, which also implies that the training offered to senior management level itself is limited. Data reveals that e-learning is offered to employees of all the other management levels when ever required in almost an equal proportion.

Figure 5.3 Management level to which e-learning is offered

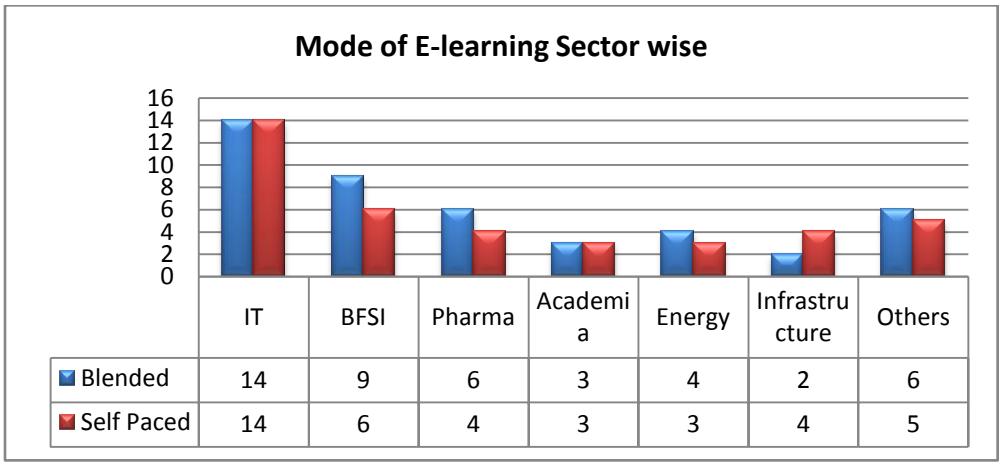


5.2.4 Mode of e-learning

Figure 5.4 depicts the mode of e-learning adopted in the organizations that have responded. The data reveals that organizations embrace both self-paced and blended learning modes of e-learning

while implementing. IT sector which is leading in terms of number of organizations offering e-learning in their main stream training also shows a similar distribution. BFSI and Pharmaceutical sectors reveal more inclination towards blended mode of training compared to self-paced e-learning.

Figure 5.4 Mode of e-learning implemented



5.2.5 E-learning Delivery Pattern

Figure 5.5.1 depicts that online instructional material is mostly used across the sectors, predominantly.

Figure 5.5.1 Online Instructional Material

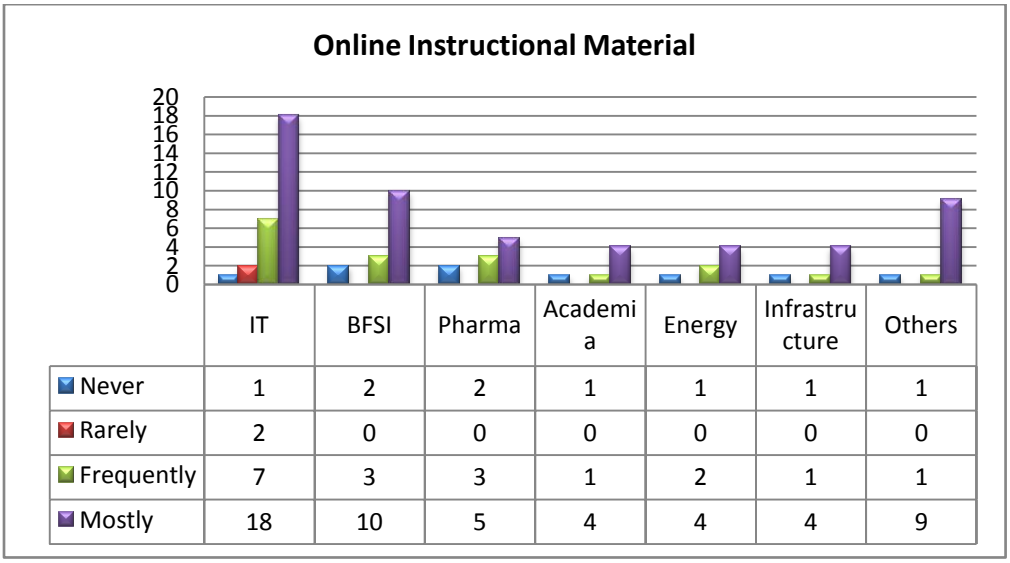
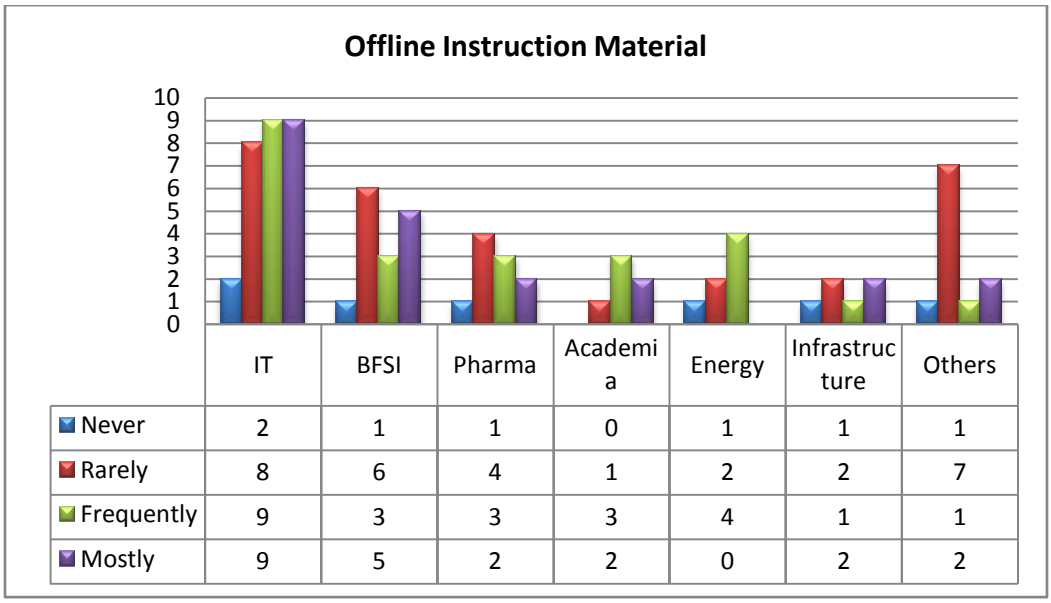


Figure 5.5.2 represents the offline instructional material usage across the industry sectors. While its usage is not as robust as that of online instructional material, it is also extensively used across the industry sectors.

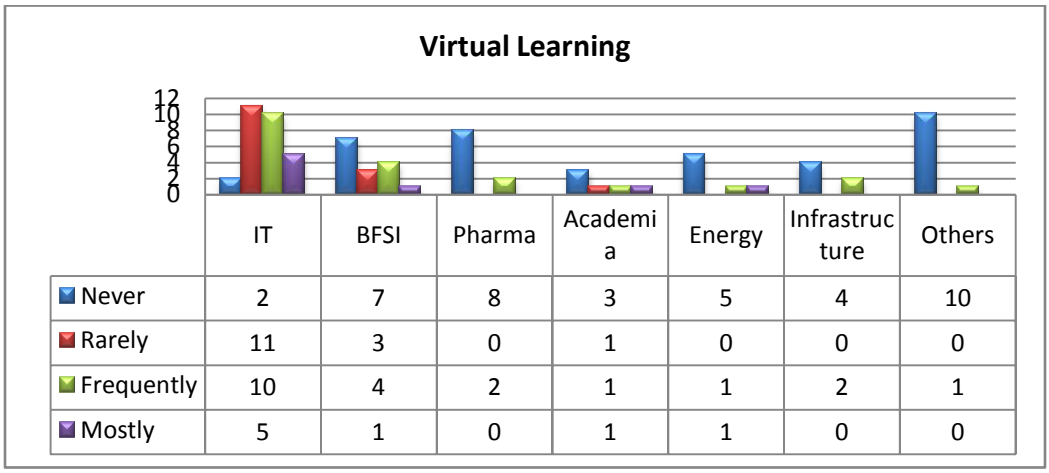
Figure 5.5.2 Offline Instructional Material



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	2	1	1	0	1	1	1
Rarely	8	6	4	1	2	2	7
Frequently	9	3	3	3	4	1	1
Mostly	9	5	2	2	0	2	2

Figure 5.5.3 depicts the virtual learning delivery pattern adopted across the industry sectors. Data reveals that this delivery pattern is not adopted as much as the other delivery patterns. Its usage even in the IT sector is minimal. Most of the organizations across the sectors have not yet taken to virtual learning.

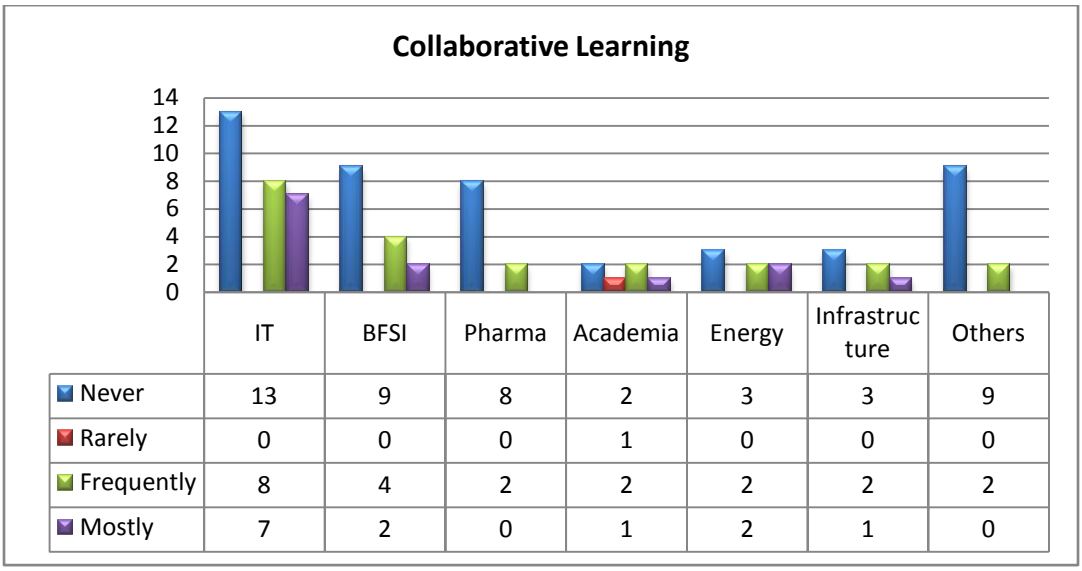
Figure 5.5.3 Virtual Learning



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	2	7	8	3	5	4	10
Rarely	11	3	0	1	0	0	0
Frequently	10	4	2	1	1	2	1
Mostly	5	1	0	1	1	0	0

Figure 5.5.4 exhibits the trend of collaborative learning across the industry sectors that have responded. Data reveals that organizations have not adopted this delivery pattern as much and this delivery pattern is not used in IT sector too.

Figure 5.5.4 Collaborative Learning

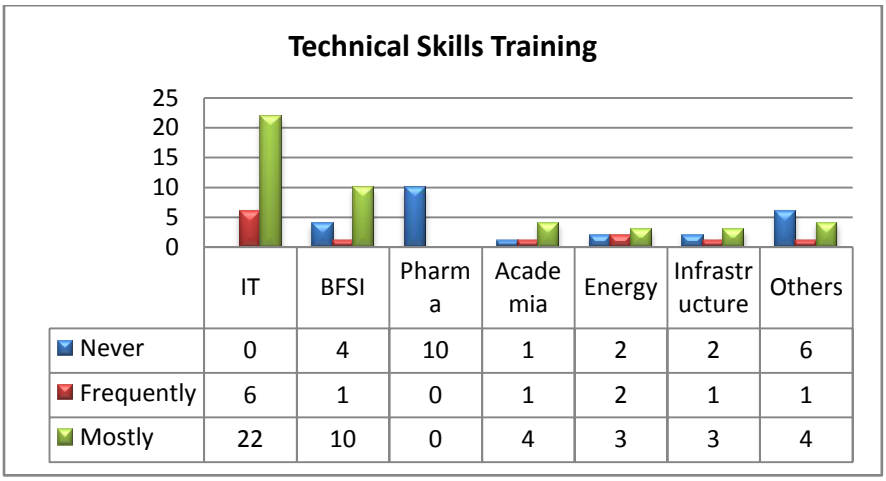


	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	13	9	8	2	3	3	9
Rarely	0	0	0	1	0	0	0
Frequently	8	4	2	2	2	2	2
Mostly	7	2	0	1	2	1	0

5.2.6 Types of training

Figures 5.6.1 to 5.6.6 depict different types of training e-learning is used for in respective industry sectors. Figure 5.6.1 presents the data related to e-learning implemented for technical skills training. Implementation is predominantly seen in the IT sector.

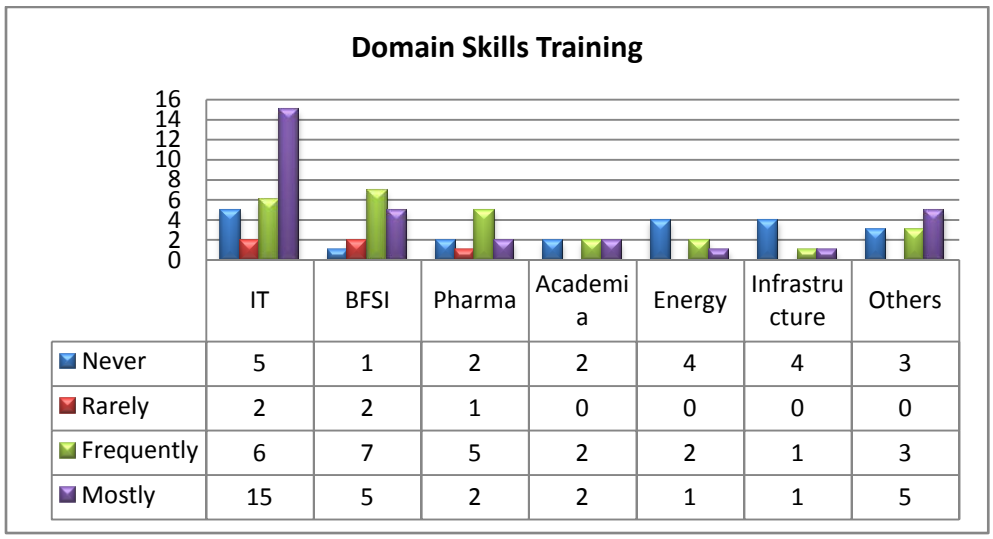
Figure 5.6.1 Technical skills training



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	0	4	10	1	2	2	6
Frequently	6	1	0	1	2	1	1
Mostly	22	10	0	4	3	3	4

Figure 5.6.2 depicts that e-learning is extensively used for domain skills training with a few exceptions, though the trend is mostly witnessed in IT sector.

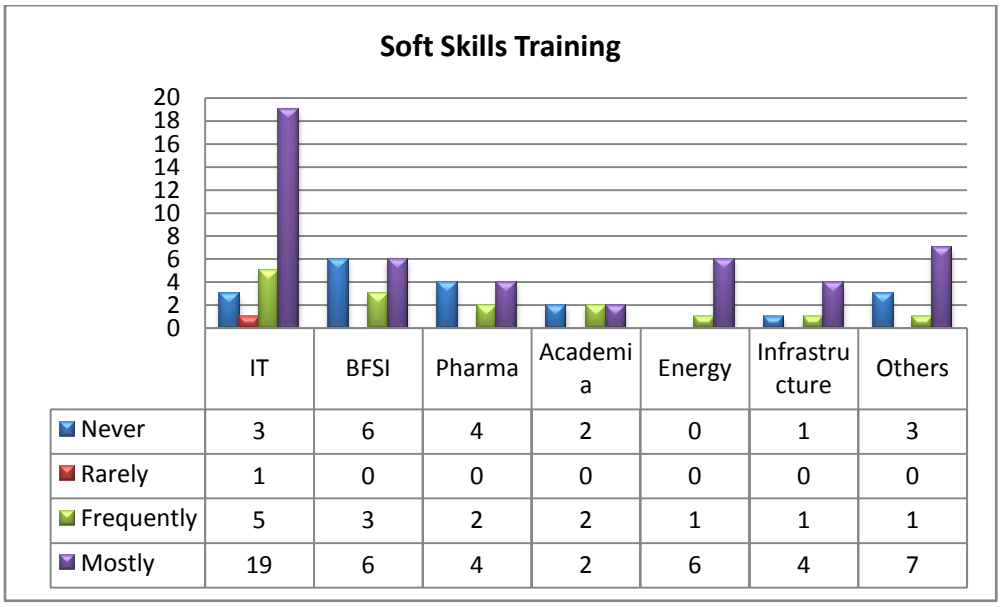
Figure 5.6.2 Domain Skills Training



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	5	1	2	2	4	4	3
Rarely	2	2	1	0	0	0	0
Frequently	6	7	5	2	2	1	3
Mostly	15	5	2	2	1	1	5

Figure 5.6.3 depicts that e-learning is also used for soft skills training with a few exceptions, and this trend is mostly witnessed in IT sector. Some organizations in sectors BFSI and Pharmaceutical do not use e-learning for soft skills training.

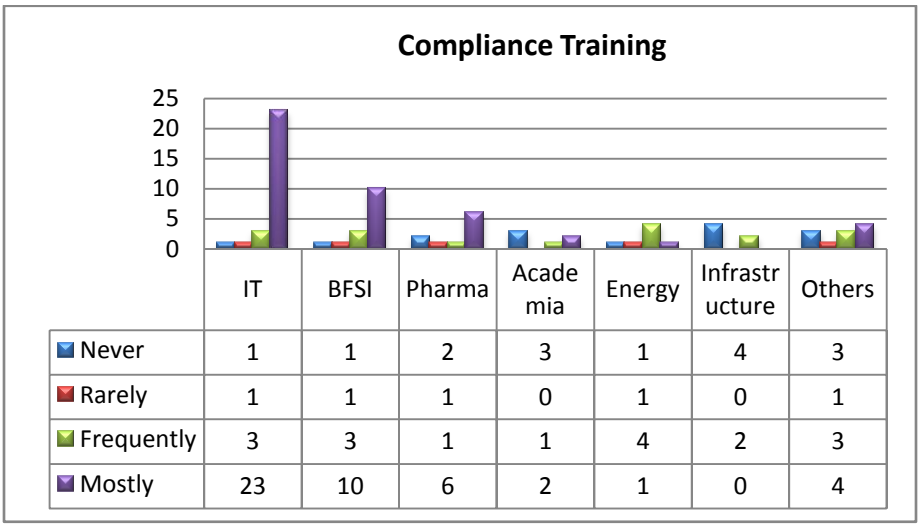
Figure 5.6.3 Soft Skills Training



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	3	6	4	2	0	1	3
Rarely	1	0	0	0	0	0	0
Frequently	5	3	2	2	1	1	1
Mostly	19	6	4	2	6	4	7

Figure 5.6.4exhibits that e-learning is extensively used for compliance training, across all the industry sectors. Usage for compliance training is robust in IT, BFSI and Pharmaceutical sectors.

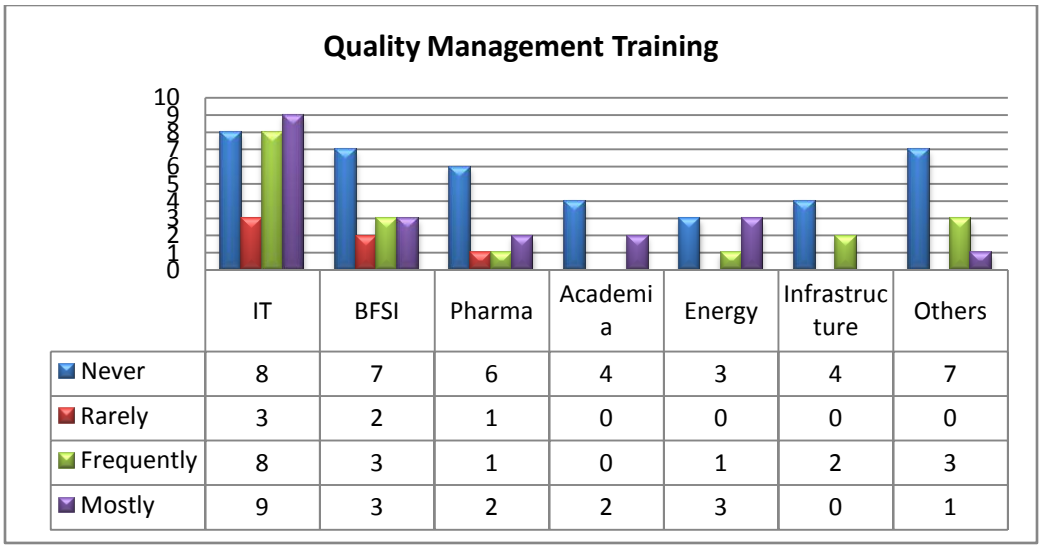
Figure 5.6.4Compliance Training



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	1	1	2	3	1	4	3
Rarely	1	1	1	0	1	0	1
Frequently	3	3	1	1	4	2	3
Mostly	23	10	6	2	1	0	4

Figure 5.6.5exhibits that e-learning is used for quality management training in some organizations of IT , BFSI, Pharma and Energy sectors, it is not that extensively used in some organizations belonging to the same sectors.

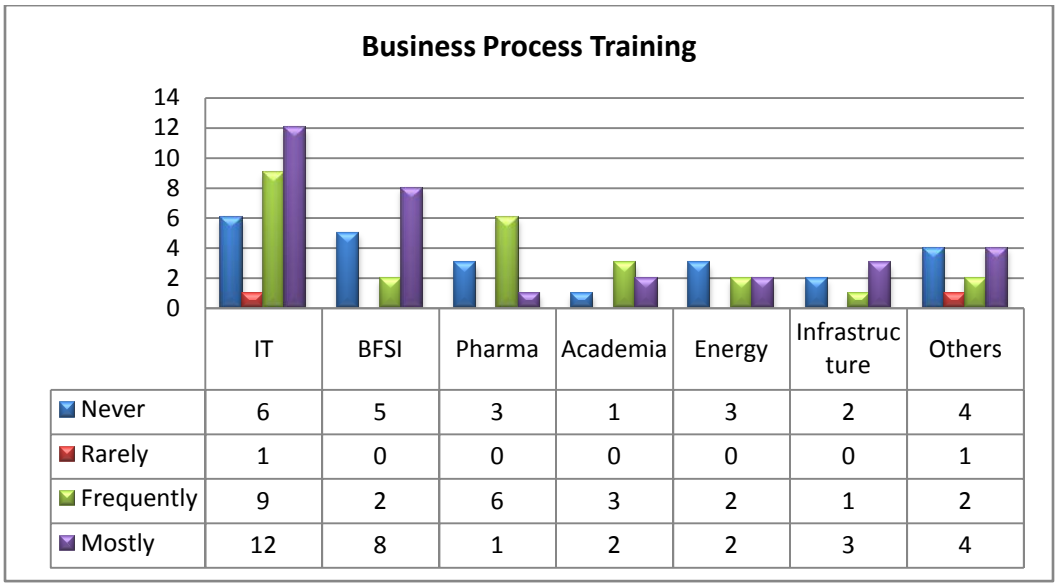
Figure 5.6.5Quality Management Training



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	8	7	6	4	3	4	7
Rarely	3	2	1	0	0	0	0
Frequently	8	3	1	0	1	2	3
Mostly	9	3	2	2	3	0	1

Figure 5.6.6exhibits that e-learning is used for Business process training across the industry sectors. While IT, BFSI and Pharmaceutical sectors use e-learning for business process training to an extent, the other sectors also exhibit the same trend.

Figure 5.6.6 Business Process Training



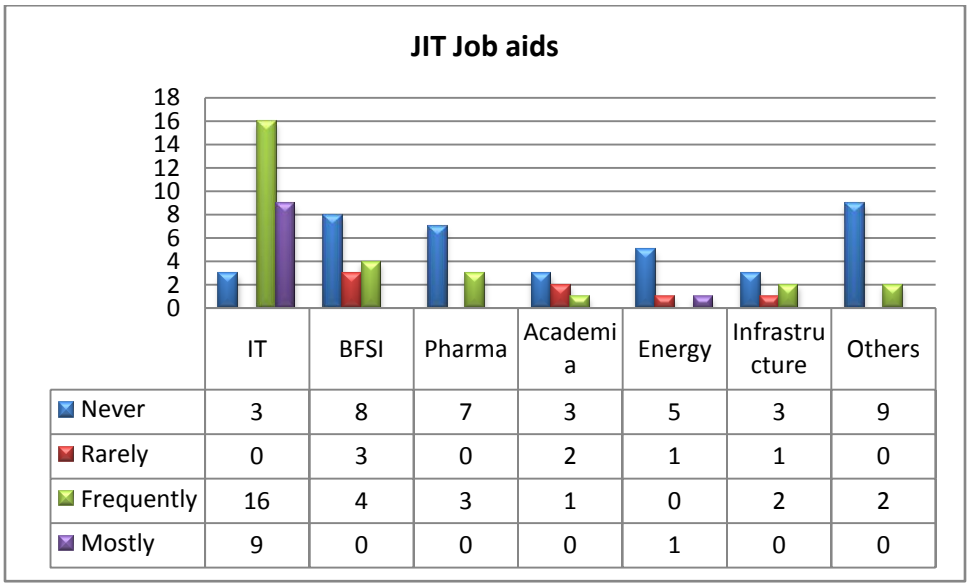
	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	6	5	3	1	3	2	4
Rarely	1	0	0	0	0	0	1
Frequently	9	2	6	3	2	1	2
Mostly	12	8	1	2	2	3	4

5.2.7 Tools used for e-learning

- Webinars are predominantly used in IT and to a moderate extent in Banking.
- Video and audio conferences used mostly in IT sector, moderately in banking sector and other sectors put together
- Live webcasting used mostly in IT sector
- Virtual learning environment, white board, electronic simulations, webinars rarely in all sectors
- Pod-casting used rarely across sectors
- M-learning used rarely across sectors

Figure 5.7.1 shows that Just in time modules are predominantly used in IT and to a moderate extent in banking.

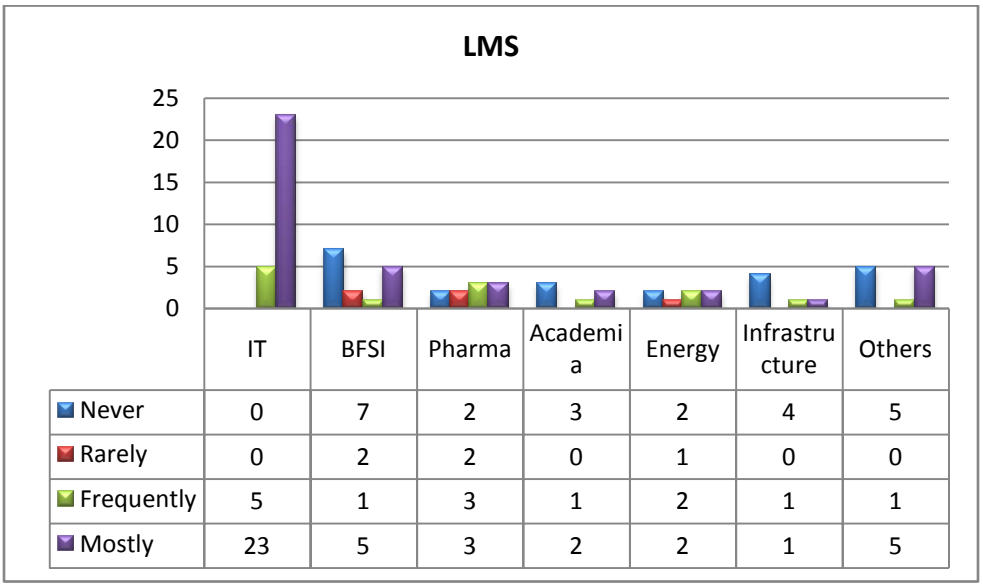
Figure 5.7.1 JIT job aids



	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	3	8	7	3	5	3	9
Rarely	0	3	0	2	1	1	0
Frequently	16	4	3	1	0	2	2
Mostly	9	0	0	0	1	0	0

Figure 5.7.2 shows that LMS is used mostly in IT sector, banking and other sectors moderately.

Figure 5.7.2 Learning Management System



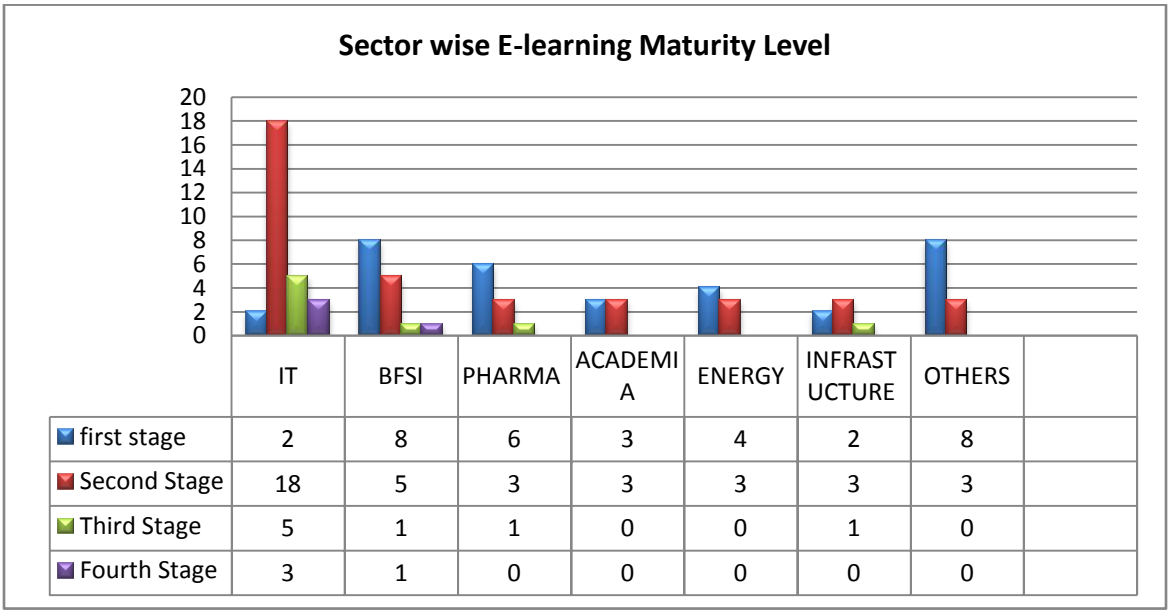
	IT	BFSI	Pharma	Academia	Energy	Infrastructure	Others
Never	0	7	2	3	2	4	5
Rarely	0	2	2	0	1	0	0
Frequently	5	1	3	1	2	1	1
Mostly	23	5	3	2	2	1	5

5.2.8 E-learning Maturity Level

The E-Learning Maturity Model (eMM) provides a means by which institutions can assess and compare their capability to sustainably develop, deploy and support e-learning (Marshall 2005). It basically analyzes the ability of an organization or an institution to deploy e-learning to engage in

high quality processes that are reproducible to meet the growing demands. Figure 4.8 depicts e-learning maturity levels of the organizations that have responded in a sector wise format.

Figure 5.8 E-learning Maturity level- Industry Sector wise



	IT	BFSI	PHARMA	ACADEMIA	ENERGY	INFRASTUCTURE	OTHERS	
first stage	2	8	6	3	4	2	8	
Second Stage	18	5	3	3	3	3	3	
Third Stage	5	1	1	0	0	1	0	
Fourth Stage	3	1	0	0	0	0	0	

The data reveals that very few organizations have moved to the fourth stage of e-learning indicating a lot of scope for growth in e-learning deployment. A lot of organizations from sectors other than IT are still in the first stage while most of the organizations of IT sector have moved onto mostly second stage, a few into third and very few into fourth stage. This indicates that organizations are yet to utilize and deploy e-learning in high quality processes and align it with their business objectives.

5.3 Descriptive statistics: Organization level responses

When transforming from a traditional training platform that has been delivered for years to e-learning platform in the main stream training, decisions have to be taken and actions must be performed by the organizations. These decisions and actions should be grounded on a careful analysis in order to serve as the starting point towards the development of a successful training redesign process, by means of more innovative approaches. Employees of the organization also tend to perceive a shift in educational culture and hence the purpose of introducing e-learning and

the benefits anticipated have to be clearly defined. Descriptive statistics enumerated in the following table 5.3 would help comprehend these dimensions as responded by organizations. Mean scores for all items are mentioned below.

Table 5.3 Purpose of introducing e-learning

Question identity		6.1	6.2	6.3	6.4	6.5	6.6	Overall
Purpose for introducing e-learning	Mean	**3.53**	**3.70**	3.48	**3.55**	2.55	3.50	3.38
	N	83	83	83	83	83	83	83
	Std. Deviation	.502	.462	.526	.524	.769	.572	.601

The criterion 6.2 shows a higher mean score which is **'Making training accessible to remote locations'.** The criterion 6.4 again exhibits a higher mean score which is **'Increase ease of access at the workplace'**. Both the mean scores indicate that organizations intention to introduce e-learning into their mainstream training is essentially to make their training portable and easily accessible. Criterion 6.1 is about **'Reducing training costs'**, and hence implies that the organizations also perceive e-learning as a cost effective training intervention. Descriptive statistics enumerated in the following table 5.4 would help understand the benefits obtained through introduction of e-learning as responded by organizations.

Table 5.4 Benefits of introducing e-learning

Question identity		7.1	7.2	7.3	7.4	7.5	7.6	Overall
Benefits of introducing e-learning	Mean	3.40	**3.60**	**3.42**	**3.41**	2.65	2.70	3.19
	N	83	83	83	83	83	83	83
	Std. Deviation	.492	.492	.497	.495	.706	.761	.57

The criterion 7.2 shows a higher mean score which is '**Train dispersed employees in remote locations'**. The criterion 7.3 again exhibits a higher mean score which is **'Build consistency and**

reliability in training. Criterion 7.4 is about **'Increase ease of access at the workplace**, and hence implies that the organizations have successfully reaped the benefit of training portability of e-learning, in addition to which they have also obtained standardization of their training. These criteria are rated high compared to other criterion.

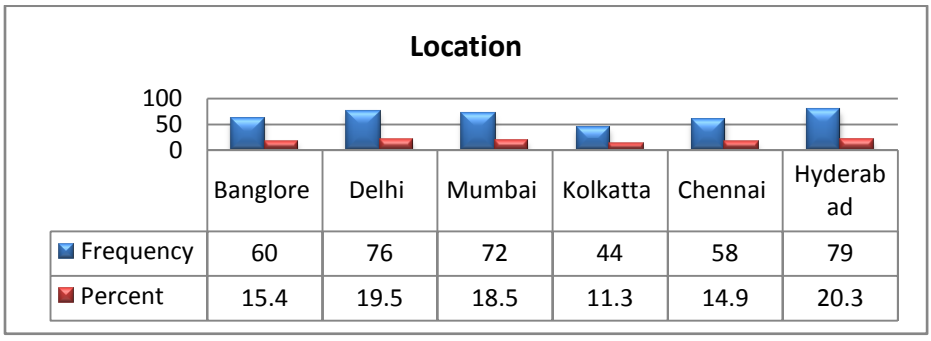
5.4 Demographics: Individual level responses

The individual level survey was done with IT industry to understand different factors that influence the adoption and factors that contribute towards the effectiveness of e-learning implemented in their organizations. At an individual level demographics surveyed were: Name of the organization the employee was working for, total number of years of work experience, age, gender, medium of education, their highest qualification, management level they belong to, job title. Their prior exposure to e-learning, number of online courses taken so far were also surveyed along with type of training e-learning is used for particularly in IT industry.

5.4.1 Location

IT industry in India has played a pivotal role in putting India on the global map. 6 major cities have emerged as major hubs for IT in India. Delhi (including Gurgaon), Mumbai (including Pune), Bangalore, Kolkata, Chennai and Hyderabad have been the cities which witnessed most of the IT establishment and employment. The sample has been sourced from all these cities and the distribution of sample across these cities is shown in Figure 4.9. While Hyderabad has yielded more responses, the other cities have constituted more or less the same number of individuals who have responded.

Figure 5.9 Location

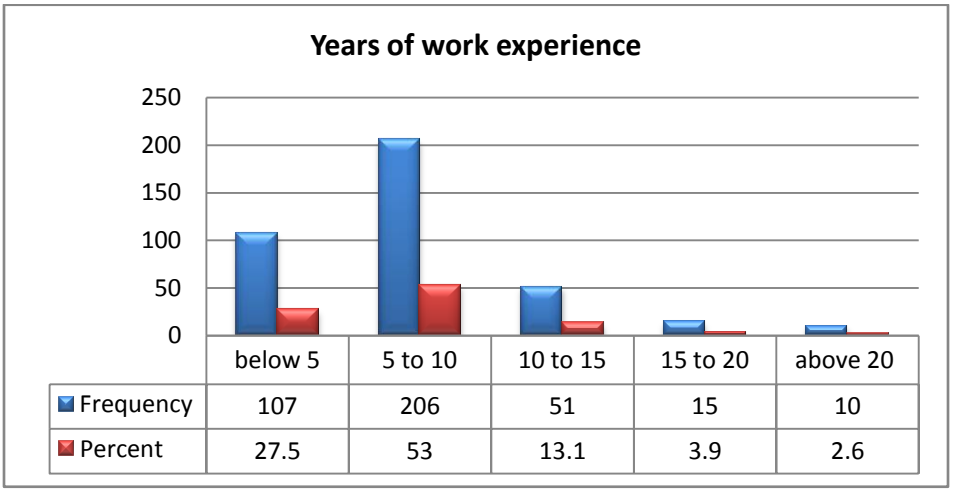


	Banglore	Delhi	Mumbai	Kolkatta	Chennai	Hyderabad
Frequency	60	76	72	44	58	79
Percent	15.4	19.5	18.5	11.3	14.9	20.3

5.4.2 Years of work experience

Employee work experience helps increasing confidence, self esteem and independence on the personal front and on a professional front increases knowledge on aspects of business requirements, organizational culture, various processes, and intricacies of job assigned.With an intention to measure the impact of work experience on various factors related to e-learning, studied in this research, years of work experience of IT professionals who are the respondents was surveyed. Figure 5.10 represents the distribution of the respondents according to their years of work experience. Majority (53%) of them belong to the range of 5 to 10 years followed by below 5 years segment (28%) which is populated next. While 13% of them lie in the segment of 10 to 15 years of work experience, there are few among the respondents who belong to the range of 15 years and above.

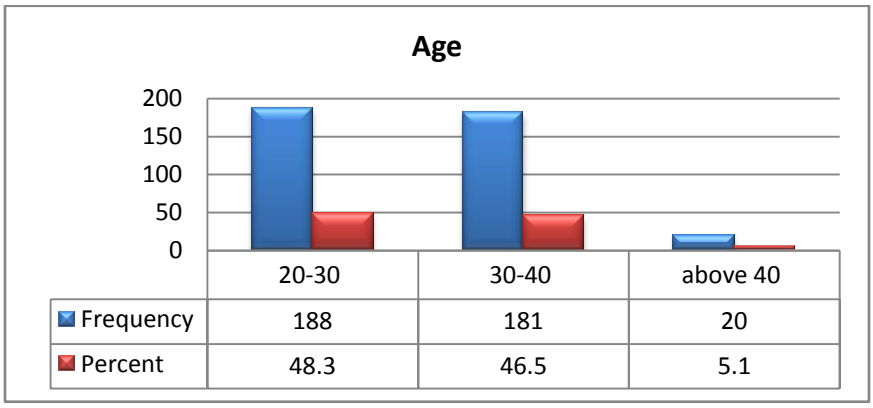
Figure 5.10 Years of work experience



5.4.3 Age of employees

Age of employees has been surveyed to analyze its influence on factors related to e-learning. Figure 5.11 shows that all the respondents belong to the range of 20 to 40 years and very few into the category of above 40 years. *IT industry* in India has always been an important source of *employment* for *young* Indian professionals which is shown in the results too.

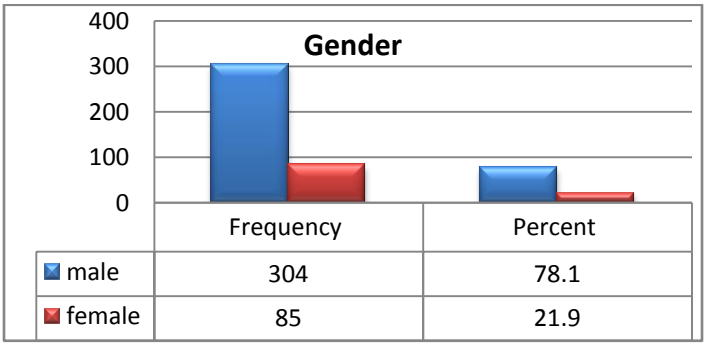
Figure 5.11 Age of IT professionals



5.4.4 Gender

Gender of IT professionals who have responded has been examined. Figure 5.12 offers the split between male and female proportion amongst the IT professionals who have responded to the survey. While 78% of them are male 22% of them are female employees.

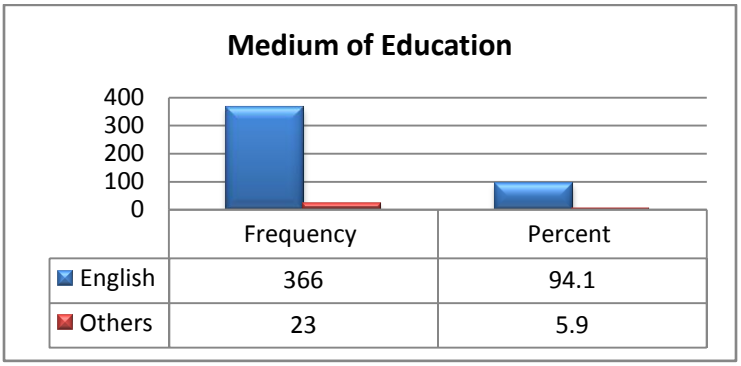
Figure 5.12 Gender



5.4.5 Medium of Education

Medium of education of respondents has been surveyed to analyze if it has an impact on the factors examined in the study. Figure 5.13 shows that majority of the IT professionals hail from an English medium background while just about 6 % come with a vernacular medium of instruction.

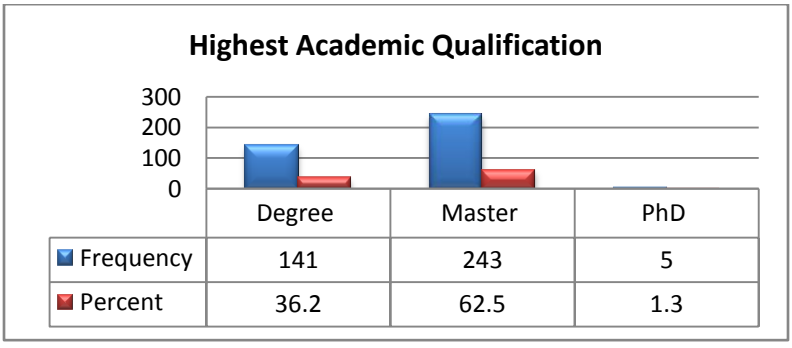
Figure 5.13 Medium of education



5.4.6 Academic Qualification

Academic qualification of respondents has been examined to study the impact on the factors studied. . Figure 5.14 depicts the data related to the highest academic qualification of IT professionals. While almost 63% of them are with a master's qualification, the rest are with a degree qualification. Amongst the respondents only about 5 of them have a Ph.D. qualification.

Figure 5.14 Academic Qualification

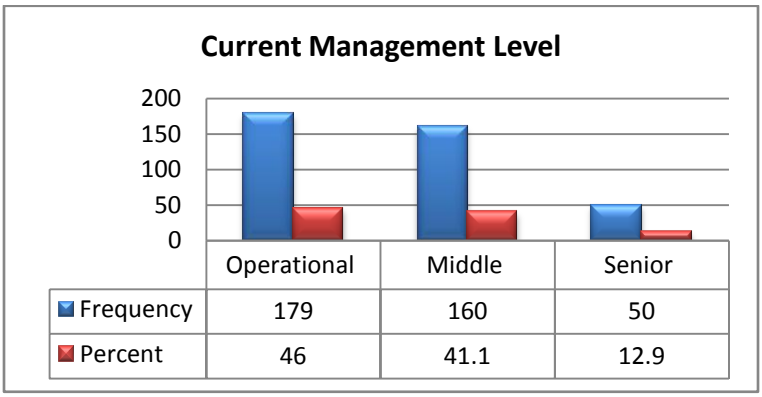


5.4.7 Current Management Level

Management level of the IT professionals who have responded has been surveyed to study the influencing factors of e-learning. Figure 5.15 shows that most of them who have responded either

belong to operational level (46%) or middle management levels (41%), about 13% of the respondents were from a senior management level.

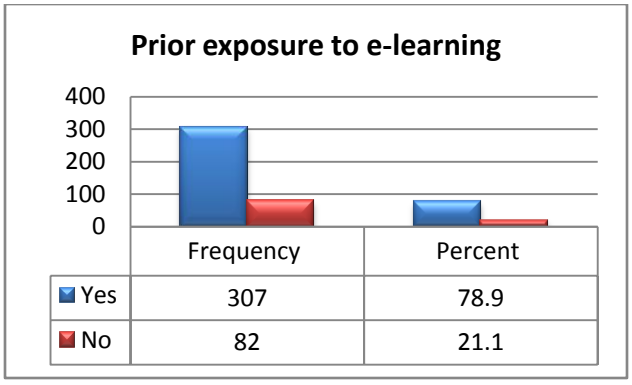
Figure 5.15 Current Management Level



5.4.8 Prior exposure to e-learning

Prior exposure to e-learning was examined as part of the individual level survey. Figure 5.16 depicts the number of employees who come with a prior exposure to e-learning in their previous organizations. While majority of them (81%) of them come with a prior exposure to e-learning, 21% embrace e-learning without any prior exposure to it.

Figure 5.16 Prior exposure to e-learning

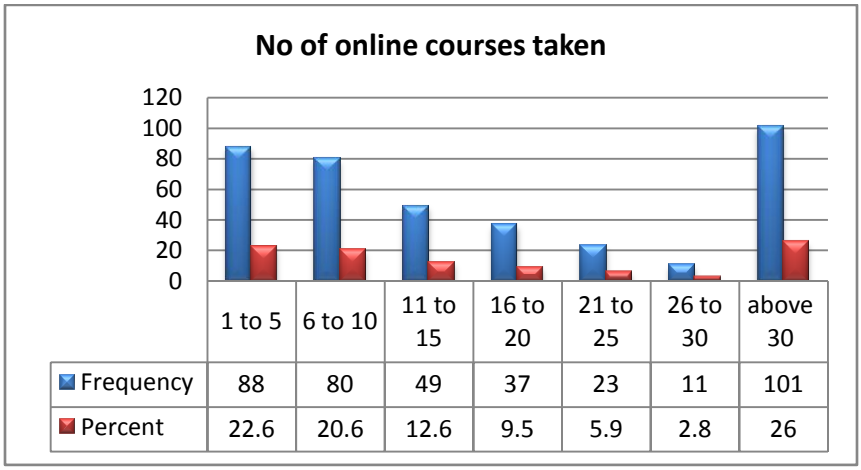


5.4.9 Number of online courses taken

To understand the impact of the number of online courses already taken by the individuals who have responded. Figure 5.17 show that almost 1/4th of the respondents have taken more than 30

online courses ad on the other side we also have respondents who have taken just about 1 to 10 courses accounting to 42% of the sample.

Figure 5.17 Number of online courses taken

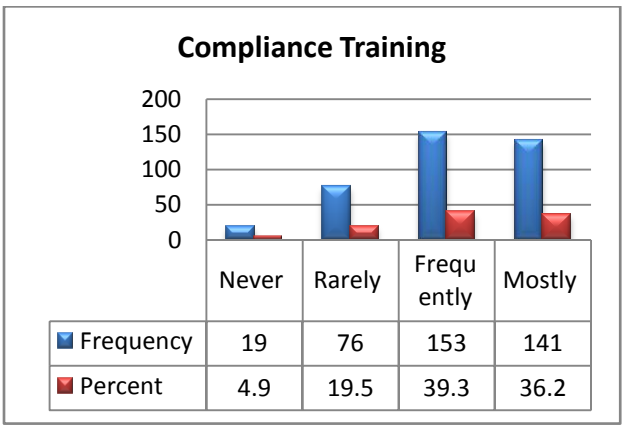


	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	above 30
Frequency	88	80	49	37	23	11	101
Percent	22.6	20.6	12.6	9.5	5.9	2.8	26

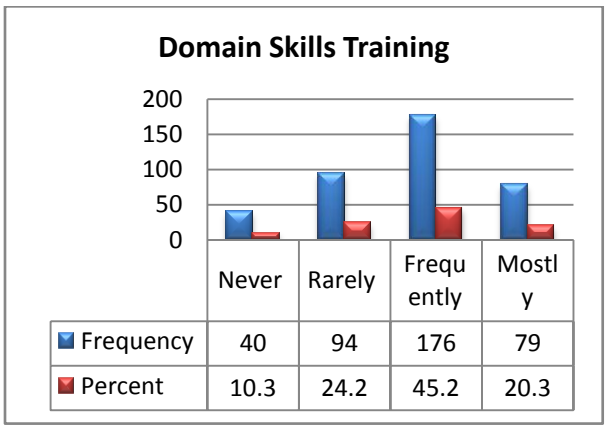
5.4.10 Type of training e-learning is used for

In order to understand the type of training that e-learning is primarily deployed for, the data collected showed that in the IT industry, e-learning is used for technical skills training, domain skills training, soft skills training to an extent, but predominantly used for compliance training as depicted in figures 5.18.1 to 5.18.4 The data also reveals that e-learning is sparingly used for business process training and quality management training in information technology.

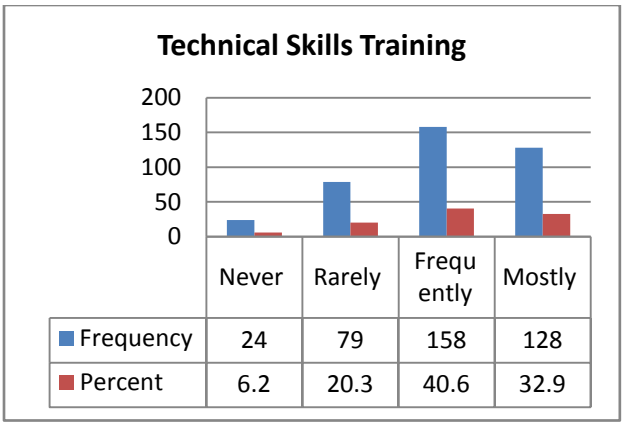
Figure 5.18 E-learning for types of training

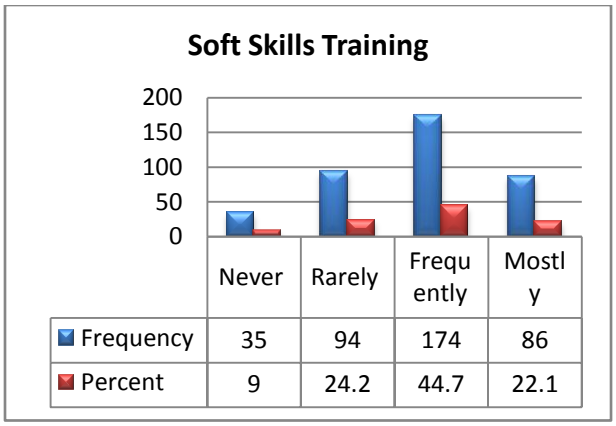


	Never	Rarely	Frequently	Mostly
Frequency	19	76	153	141
Percent	4.9	19.5	39.3	36.2



	Never	Rarely	Frequently	Mostly
Frequency	40	94	176	79
Percent	10.3	24.2	45.2	20.3





5.5 Descriptive statistics: Individual level responses

Learning is an active process in which a learner uses sensory input and constructs meaning out of it, not a passive acceptance of knowledge that already exists. Constructivist learning always begins from a learner's point of view (Jonassen et al. 1995; Shang, Shi, and Chen 2001). In the field of information technology, knowledge workers need to continuously engage themselves in learning to keep abreast of rapidly changing technologies and hence this study aims at providing insights into Indian IT professionals' demographics, in relation to various factors that influence their acceptance of e-learning and its effectiveness. Descriptive statistics of influencing factors from various dimensions, such as: Interactivity dimension, utility dimension, Social dimension, Organizational dimension, motivational dimension, technology experience dimension and subjective dimension are listed. Similarly descriptive statistics related to contributing factors of e-learning effectiveness have also been presented.

Table 5.5 would help comprehend the self-efficacy of individuals who have responded. Mean scores for all items are mentioned below. Compeau and Higgins (1995) have included self-efficacyin their study on e-learning. The current scale used in this study is adopted from the study of Compeau and Higgins (1995).

Table 5.5 E-learning self efficacy

Question identity		**15.1**	**15.2**	**15.3**	**15.4**	**15.5**	**Overall**
E-learning Self Efficacy	Mean	**3.27**	**3.14**	2.73	2.91	2.91	3.00
	N	389	389	389	389	389	389
	Std. Dev.	.640	.713	.897	.793	.791	.760

The criterion 15.1 shows a higher mean score which is **'I feel confident operating e-learning functions even if there is no one around to tell me what to do as I go' .** The criterion 15.2 again exhibits a higher mean score which is **'I feel confident using e-learning content if I had built-in help facility for assistance'**. Both the mean scores indicate that IT professionals are tech savvy and are comfortable with the built-in help and find it easy to operate e-learning modules given to them.

Scale used in the instrument while measuring Ease of use has been adopted from Davis (1989) and Selim (2003). Table 5.6 depicts descriptive statistics of Ease of use as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.6 Ease of use

Question identity		**16.1**	**16.2**	**16.3**	**16.4**	**16.5**	**16.6**	**Overall**
Ease of using e-learning	Mean	3.12	**3.19**	**3.17**	3.09	3.05	**3.29**	3.19
	N	389	389	389	389	389	389	389
	Std. Deviation	.529	.616	.544	.726	.605	.578	.57

The criterion 16.6 shows a higher mean score which is **'Opportunity to practice or experiment can enhance user friendliness'.** This indicates that while the IT professionals are comfortable using e-learning for their training they would find it beneficial if they had an opportunity or experiment before they get started with the course. Criterion 16.2 shows a higher mean score which says **'Navigation between the screens in e-learning was easy'.** The criterion 16.3 again exhibits a higher mean score which is **'E-learning environments are clear and understandable helping me to learn'**. Both the mean scores indicate that IT professionals are tech savvy and are comfortable with e-learning offered to them.

Scale used in the instrument to measure E-learning content quality has been adopted from a study done by Arbaugh 2000. Table 5.7 depicts descriptive statistics of content quality of e-learning as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.7 E-learning content quality

Question identity		17.1	17.2	17.3	17.4	17.5	Overall
E-learning Content Quality	Mean	3.07	3.26	**3.41**	**3.37**	**3.30**	3.28
	N	389	389	389	389	389	389
	Std. Deviation	.622	.585	.583	.572	.561	.584

The criterion 17.3 shows a higher mean score which is **'Use of examples in e-learning can help me understand subject better'.** It shows that end users from IT industry would prefer examples in their content to enhance their comprehension. Criterion 17.4 shows a higher mean score which says **'Interactivity in e-learning promotes learning'.** The criterion 17.5 again exhibits a higher mean score which is **'Logical arrangement and presenting in understandable chunks would enhance learning'**. Both the mean scores portray the importance attributed to the logical organization of the content and the interactivity element which facilitates learner's concentration and thence learning.

Scale used in the instrument to measure Perceived usefulness has been adopted from a study done by Davis (1989). Table 5.8 depicts descriptive statistics of perceived usefulness of e-learning as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.8 Perceived Usefulness

Question identity		18.1	18.2	18.3	18.4	18.5	Overall
Perceived Usefulness	Mean	**3.42**	3.03	**3.04**	**3.05**	3.03	3.11
	N	389	389	389	389	389	389
	Std. Deviation	.571	.631	.616	.640	.543	.6

The criterion 18.1 shows a higher mean score which is **'I believe E-learning is a useful learning tool'.** Criterion 18.3 shows a higher mean score which says **'E-learning offers things I want to learn'.** The criterion 18.4 again exhibits a higher mean score which is **'E-learning courses enhanced my productivity at workplace'**. All the mean scores highlight IT professional's

perception of e-learning as an useful training intervention helping them learn what is needed and enhancing their productivity at work.

Scale used in the instrument to analyze subjective norms of the user has been adopted from a study done by Gattiker&Hlavka (1992).Table 5.9 depicts descriptive statistics of subjective norms as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.9 Subjective norms

Question identity		19.1	19.2	19.3	19.4	Overall
Subjective Norms	Mean	**3.09**	2.88	2.82	**3.04**	2.95
	N	389	389	389	389	389
	Std. Deviation	.563	.608	.653	.616	.61

The criterion 19.1 shows a higher mean score compared to the remaining items, which is **'My organization thinks I should use e-learning'.** Criterion 19.4 shows a higher mean score next, which says **'It is important for me to fit into the group that I am with'.** Both the mean scores on higher side indicate the social influence on IT professionals who strongly think that they need to get along with the cohort they belong to and that it is organizations' decision that propels them to take to e-learning.

Scale used in the instrument to analyze Learning culture of the organization an individual belongs to has been adopted from a study done by Arbaugh (2000).Table 5.10 depicts descriptive statistics of Learning culture of their organization as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.10 Learning Culture

Question identity		20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	Overall
Learning Culture	Mean	2.96	2.94	2.90	2.81	2.81	3.01	**3.14**	**3.04**	2.91	2.94
	N	389	389	389	389	389	389	389	389	389	389
	Std. Deviation	.637	.641	.634	.792	.701	.630	.579	.643	.730	.583

The criterion 20.7 shows a higher mean score compared to the remaining items, which is **'I feel organization values employee self development and progressive innovation'.** Criterion 20.8 shows a higher mean score next, which says **'Organization provides me with an appropriate job and a role'.**Both the mean scores on higher side indicate that the IT organizations value employee self development and offer role clarity in the position they work for.

Scale used in the instrument to analyze pre-training attitude of the individuals has been adopted from a study done by Tracey et al. (1995).Table 5.11 depicts descriptive statistics of Pre-training attitude of respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.11 Pre-Training attitude

Question identity		**21.1**	**21.2**	**21.3**	**21.4**	**21.5**	**21.6**	**21.7**	**21.8**	**Overall**
Pre-Training attitude	Mean	2.74	2.30	2.80	**3.22**	**3.15**	2.38	2.16	2.85	2.7
	N	389	389	389	389	389	389	389	389	389
	Std. Deviation	.941	.975	.987	.950	.920	.968	.989	.991	.965

The criterion 21.4 shows a higher mean score compared to the remaining items, which is **'Having a long-range career goal is important '.** Criterion 21.5 shows a higher mean score next, which says **'Contributing to a more highly-skilled workplace is important'.** Both the mean scores which are high clearly showcase the attitude of an IT professional who is ambitious and committed in his contribution to the workplace. It could be this behavior which motivates them to embrace e-learning to upgrade their skill set.

Scale used in the instrument to analyze learning motivation of the individuals has been adopted from a study done by Hicks and Klimoski (1987). Table 5.12 depicts descriptive statistics of learning motivation of the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.12 Learning Motivation

Question identity		22.1	22.2	22.3	22.4	22.5	22.6	Overall
Learning Motivation	Mean	3.18	**3.30**	3.22	**3.35**	3.19	3.18	3.23
	N	389	389	389	389	389	389	389
	Std. Deviation	.550	.574	.594	.562	.634	.609	.586

The criterion 22.4 shows a higher mean score compared to the remaining items, which is **'I think learning is always a good chance to improve my task ability '.** Criterion 22.2 shows a higher mean score next, which says **'I prefer material that challenges me so that I can learn new things '.** Both the mean scores which are high help us analyze the learning motivation of IT professionals. They are into a mode of continuous learning to constantly upgrade their skills to meet the rapid technological changes in their domain.

Scale used in the instrument to understand internet experience of the individuals has been adopted from a study done by Tan and Teo (2000). Table 5.13 depicts descriptive statistics of internet experience of the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.13 Internet Experience

Question identity		23.1	23.2	23.3	23.4	Overall
Internet Experience	Mean	3.14	3.19	**3.33**	**3.53**	3.29
	N	389	389	389	389	389
	Std. Deviation	.730	.648	.522	.563	.615

The criterion 23.4 shows a higher mean score compared to the remaining items, which is **'I often use internet to search for specific information'.** Criterion 23.3 shows a higher mean score next, which says **'Organization can use internet effectively for training and development '.** Both the mean scores which are high help us understand the internet experience of IT professionals. They are highly internet savvy and would also readily accept the fact that internet can be used for

training. This aspect perhaps would yield a different result if tested with some other sector of industry.

Scale used in the instrument to understand computer anxiety of the individuals has been adopted from a study done by Gattiker&Hlavka (1992). Table 5.14 depicts descriptive statistics of computer anxiety of the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.14 Computer Anxiety

Question identity		**24.1**	**24.2**	**24.3**	**24.4**	**Overall**
Computer Anxiety	Mean	1.76	1.75	1.75	1.71	1.74
	N	389	389	389	389	389
	Std. Deviation	.775	.816	.841	.881	.782

Low mean scores only reassure the fact that It professionals do not have any anxiety towards using computer. Though this factor is rated low in this case, it might have significance when tested with a different sector and has been included with an intention to provide a complete measurement of factors influencing e-learning adoption.

Scale used in the instrument to measure e-learning effectiveness as perceived by the individuals has been adopted from a study done by Ahmed Gad abdel –Wahab (2008).Table 5.15 depicts descriptive statistics of perceived e-learning effectiveness of the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.15 Perceived e-learning effectiveness

Question identity		**25.1**	**25.2**	**25.3**	**25.4**	**25.5**	**25.6**	**25.7**	**25.8**	**Overall**
Perceived e-learning effectiveness	Mean	3.04	3.03	3.08	**3.11**	2.84	2.94	**3.20**	**3.36**	3.07
	N	389	389	389	389	389	389	389	389	389
	Std. Deviation	.566	.576	.759	.655	.626	.612	.476	.555	.603

The criterion 25.8 shows a higher mean score compared to the remaining items, which is **'I believe e-learning makes training accessible to employees at remote locations '.** Criterion 25.7 shows a higher mean score next, which says **'E-learning helped us acquire intended knowledge, skills and attitudes '.** Criterion 25.4 with a mean score of 3.11 is **'Using e-learning is useful as it decreases travel expenses and provides ease of access '.**The mean scores which are high reinforce the fact that IT professionals perceive e-learning effectiveness primarily in terms of its accessibility anytime and anywhere. Secondly it also emphasizes that they find e-learning as a competency enhancement tool. Criterion 25.5 is about improving satisfaction by using e-learning which is relatively rated low.

Scale used in the instrument to understand e-learning transfer has been adopted from a study done by Holton, Bates and Ruona(2000), Rouiller and Goldstein (1993). Table 5.16 depicts descriptive statistics of e-learning transfer as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.16 E-learning transfer

Question identity		26.1	26.2	26.3	26.4	26.5	Overall
E-learning transfer	Mean	2.81	**3.01**	2.95	2.95	**3.04**	2.95
	N	389	389	389	389	389	389
	Std. Deviation	.664	.565	.583	.603	.612	.605

The criterion 26.5 shows a higher mean score compared to the remaining items, which is **'I give 100% effort to learn as much possible during the e-learning training given in the organization '.** Criterion 26.2 shows a higher mean score next, which says **'The activities that I have learnt during online course helped me know how to apply my learning on the job '.** Both mean scores that the IT professionals put in their 100% to learn and have obtained relevant knowledge related to the application of their learning on the job.

Scale used in the instrument to understand achievement and satisfaction as perceived by individuals in IT industry has been adopted from a study done by Nehari and Bender (1987). Table 5.17 depicts descriptive statistics of achievement and satisfaction as perceived by the respondents. Mean scores of all items related to this factor are mentioned below.

Table 5.17 Achievement and Satisfaction

Question identity		27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	Overall
Achievement and Satisfaction	Mean	2.93	**3.12**	2.32	2.48	2.98	2.87	3.02	**3.08**	3.04	2.87
	N	389	389	389	389	389	389	389	389	389	389
	Std. Deviation	.787	.591	.795	.720	.574	.678	.605	.595	.578	.651

The criterion 27.2 shows a higher mean score compared to the remaining items, which is **'I consider e-learning experience as time and effort very well spent '.** Criterion 27.8 shows a higher mean score next, which says **'Having used e-learning, I would recommend it to my colleagues to use it for study purposes '.** Both mean scores reflect the achievement and satisfaction of using e-learning as part of their training. They feel that e-learning is a satisfactory toll to earn and dissipate knowledge.

Table 5.18 enlists all the factors studied and related mean of questionnaire items and overall mean for each factor. Among all the factors studied, it is content quality that is rated high comparatively. User's opinion that use of examples and interactivity in the content can enhance their productivity is emphasized. Ease of use, internet experience and learning motivation are three factors that are also rated relatively higher than other factors. These factors emphasize the facts that IT professionals are internet savvy and find using e-learning easier. The higher mean for learning motivation factor reinforces the continuous learning that IT professionals take to as part of their profession.

Table 5.18: Summary Of Means, Standard Deviations of Factors Studied

S.No	Factor	Items	Individual Means									Overall
1	self efficacy	5	3.2	3.1	2.7	2.9	2.9					3.0
2	Ease of use	6	31	3.2	3.1	3.0	3.0	3.3				3.2

Table 5.18: Summary Of Means, Standard Deviations of Factors Studied												
3	Content Quality	5	3.0	3.2	3.4	3.3	3.3					3.3
4	Perceived Usefulness	5	3.4	3.0	3.0	3.0	3.0					3.1
5	Subjective Norms	4	3.0	2.8	2.8	3.0						3.0
6	Learning culture	9	3.0	2.9	2.9	2.8	2.8	3.0	3.1	3.0	2.9	2.9
7	Pre-training attitude	8	2.7	2.3	2.8	3.2	3.1	2.3	2.1	2.8		2.7
8	Learning motivation	6	3.1	3.3	3.2	3.3	3.1	3.1				3.2
9	Internet experience	4	3.1	3.1	3.3	3.5						3.2
10	Computer Anxiety	5	1.7	1.7	1.7	1.7	1.7					1.7
11	Perceived e-learning effectiveness	8	3.0	3.0	3.0	3.1	2.8	2.9	3.2	3.3		3.0
12	E-learning transfer	5	2.8	3.0	2.9	2.9	3.0					3.0
13	Achievement and satisfaction	9	2.9	3.1	2.3	2.4	2.9	2.8	3.0	3.0	3.0	2.9

5.6 Analysis at organizational level in the study:

5.6.1 Assessment of organizations' variation in mode of e-learning chosen with respect to purpose and benefits of e-learning

Purpose of introducing e-learning is a crucial decision taken by an organization. Choosing between the modes of e-learning, namely self paced or blended learning is equally vital to sustain the continuity of e-learning training intervention. Hypothesis 1 aims at analyzing if there is a relationship between purpose of introduction of e-learning and mode chosen.

H1: There exists a relationship between mode of e-leaning organization chooses and purpose of e-learning introduction

Chi-square Test done with the sample yielded following results as presented in Table 5.19.1 and 5.19.2.

Table 5.19.1 Chi-square test - Mode of e-learning vs Purpose of e-learning

			Purpose of e-learning			**Total**
			Disagree	Agree	Strongly agree	
Mode of e-learning chosen	**Self-paced**	Count	26	11	7	44
		% within Mode of e-learning offered	59.1%	25.0%	15.9%	100.0%
	Blended	Count	25	7	7	39
		% within Mode of e-learning offered	64.1%	17.9%	17.9%	100.0%

Table 5.19.2Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.610[a]	2	.737
Likelihood Ratio	.615	2	.735
Linear-by-Linear Association	.031	1	.861
N of Valid Cases	83		

As seen in the table above, the Chi-Square significance value is .737 which is more than the alpha value of .05 which shows there is no significant relationship between organizations' purpose of e-learning introduction and mode chosen to offer e-learning. **Hence the hypothesis framed is rejected.**

Similarly hypothesis 2 has been formulated to check if there exists a relationship between benefits acquired by organization due to e-learning and the mode of e-learning chosen by the organization.

H2: There exists a relationship between mode of e-leaning organization chosen and benefits achieved through e-learning

Chi-square Test done with the sample yielded following results as presented in Table 5.20.1 and 5.20.2.

Table 5.20.1 Chi-square test Mode of e-learning vs Benefits of e-learning

			Benefits of e-learning			**Total**
			Disagree	Agree	Strongly Agree	
Mode of e-learning offered	**Self-paced**	Count	22	17	5	44
		% within Mode of e-learning offered	50.0%	38.6%	11.4%	100.0%
	Blended	Count	18	15	6	39
		% within Mode of e-learning offered	46.2%	38.5%	15.4%	100.0%

Table 5.20.2 Chi-Square tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.316	2	**.854**
Likelihood Ratio	.315	2	.854
Linear-by-Linear Association	.257	1	.612
N of Valid Cases	83		

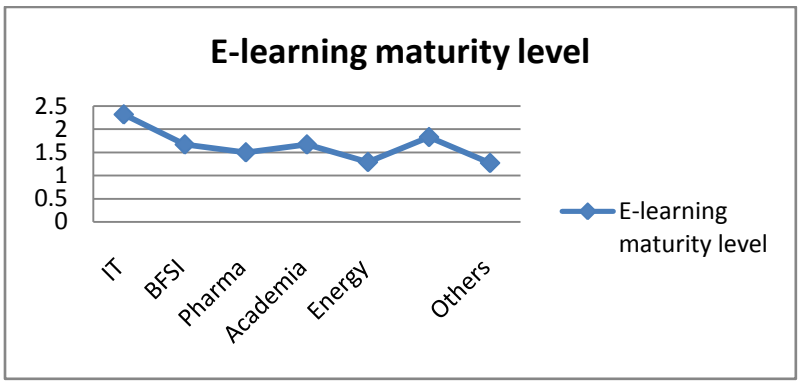
As seen in the table above, the Chi-Square significance value is .854which is more than the alpha value of .05 which shows there is no relationship between organizations' benefits of e-learning and mode chosen to offer e-learning. **Hence the hypothesis framed is rejected.**

5.6.2 Assessment of e-learning maturity level variation with respect to industry sector

E-learning maturity level of the organizations has been identified using questionnaire. The organizations under study were chosen from different industries. It is interesting to analyze if e-learning maturity level of the organization differs with the industry sector it belongs to. Hypothesis 3 has been formulated to check the association.

H3: There exists a relationship between industry sector an organization belongs to and its e-learning maturity level

Figure 5.19 Mean scores on e-learning maturity level of organizations



The mean scores of various sectors plotted in graph show a wide deviation amongst themselves. Although a graphical representation of mean scores on e-learning maturity level (figure 5.19) show vide variations amongst various industry sectors, it does not indicate whether the differences were statistically significant. To assess inter-industry sector variations in e-learning maturity level, ANOVA test was used as presented in Tables 5.21.1 &5.21.2

Table 5.21.1 Results of ANOVA

Descriptives of E-learning Maturity Level of the organization					
	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
IT	28	2.32	.772	2.02	2.62
BFSI	15	1.67	.900	1.17	2.16
Pharma	10	1.50	.707	.99	2.01
Academia	6	1.67	.516	1.12	2.21
Energy	7	1.29	.488	.83	1.74
Infrastructure Realty	6	1.83	.753	1.04	2.62
Others	11	1.27	.467	.96	1.59

N=83

Table 5.21.2 ANOVA

E-learning Maturity level	Mean Squares		F Ratio	Sig
	Between Groups	Within Groups	4.401	.001*
	13.801	39.718		

F statistically significant (p<.05)

From the above ANOVA table F significant value of self-efficacy is 0.001 (which is less than 0.05), so we accept alternative hypothesis. It means that there is a significant difference in means among the organizations' industry sectors with respect to e-learning maturity level. This implies that there is a significant relationship between the industry sector organization belongs to and e-learning maturity level. **Hence the hypothesis is accepted.**

5.7Analysis at individual level in the study:

5.7.1 Association amongst factors related to perceived e-learning interactivity, e-learning effectiveness and learner motivation

Correlations in perceived dimensions of e-learning interactivity as responded by IT professionals, Pearson's product-moment correlation scores were calculated for each pair of these factors. Table 5.22 shows five pairs of strong correlations at p<.01.Content quality, ease of use and self-efficacy belong to the e-learning interactivity dimension. Correlation measures amongst the factors of interactivity dimension show that content quality is positively significantly correlated with ease of use (r = .620). Ease of use and self-efficacy, similarly content quality and self-efficacy show moderate positive correlation.

Correlations in factors of e-learning effectiveness as responded by IT professionals were calculated for each pair. Perceived e-learning effectiveness, Achievement and Satisfaction, and E-learning transfer are three factors which contribute to e-learning effectiveness. An analysis of correlation measures show that perceived e-learning effectiveness is positively and strongly correlated with achievement and satisfaction (r = .584). Correlation measure between factors E-learning transfer and Achievement and satisfaction is significant (r = .618) and shows positive correlation. Similarly

the factors e-learning transfer and perceived e-learning effectiveness show a significant positive correlation (r = .594).

Correlations in factors of motivation dimension as responded by IT professionals were calculated for each pair. Learning motivation and pre-training attitude are two factors which belong to motivation dimension in the study. Correlation measure between factors Learning motivation and pre-training attitude at workplace is significant (r = .514) and shows positive correlation.

Table 5.22 Correlation analysis of related factors

Correlations								
	Self efficacy	**Ease of use**	**Content quality**	**Achievement and satisfaction**	**E-learning effectiveness**	**E-learning transfer**	**learning motivation**	**Training @workplace**
Self efficacy	1							
Ease of use	.330**	1						
Content quality	.363**	**.620****	1					
Achievement and satisfaction	.297**	.309**	.382**	1				
E-learning effectiveness	.296**	.437**	.427**	**.584****	1			
E-learning transfer	.366**	.304**	.425**	**.618****	**.594****	1		
learning motivation	.303**	.413**	.450**	.323**	.354**	.452**	1	
Training @workplace	.315**	.268**	.302**	.475**	.340**	.438**	**.514****	1

**. *Correlation is significant at the 0.01 level (2-tailed).*

5.7.2 Variations in factors in relation to demographic variables

According to Jonassen et al. 1995; Shang, Shi, and Chen 2001 constructivist learning always begins from a learner's point of view. So, demographic profile of an employee also plays a vital

role in controlling their learning in case of e-learning training intervention. In order to measure statistically significant difference between the means of various factors of e-learning adoption and e-learning effectiveness with relation to demographic variables ANOVA test has been used. Hypothesis 4 has been formulated to check the relationship between academic qualification and e-learning factors. Table 5.23 represents the ANOVA results.

Variation in e-learning factors in relation to Academic qualification

H4: There exists a relationship between Academic qualification of respondent and factors contributing to e-learning effectiveness

Table 5.23 IT professionals Academic Qualification vs. Factors contributing to E-learning effectiveness - ANOVA

Academic Qualification	Mean Squares		F Ratio	Sig	Hypothesis Result
	Between Groups	Within Groups			
Achievement and satisfaction	.209	.191	1.097	0.335	Rejected
Perceived E-learning effectiveness	.004	.124	0.034	0.967	Rejected
E-learning transfer	.313	.211	1.481	0.229	Rejected

F statistically significant ($p<.05$)

From the above ANOVA table F significant value of Achievement and satisfaction is .335 (which is more than 0.05), so we reject alternative hypothesis. It means that there is no significant difference in means among the respondents' academic qualifications with respect to achievement and satisfaction acquired through e-learning. This implies that there is no significant relationship between academic qualification of an IT professional and the factor achievement and satisfaction.

H4a: There exists a relationship between Academic qualification of respondent and achievement and satisfaction acquired through e-learning

Result: Rejected

Similarly, from the above ANOVA table F significant value of perceived e-learning effectiveness is .967 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between academic qualification of an IT professional and the factor perceived e-learning effectiveness.

H4b: There exists a relationship between Academic qualification of respondent and perceived e-learning effectiveness

Result: Rejected

Also, from the above ANOVA table F significant value of perceived e-learning transfer is .229 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between academic qualification of an IT professional and the factor e-learning transfer.

H4c: There exists a relationship between Academic qualification of respondent and e-learning transfer

Result: Rejected

Table 5.24 represents the ANOVA results analyzing the relationship between academic qualification of an IT employee and factors influencing e-learning adoption. Hypothesis 5 has been formulated to check the relationship between academic qualification and various factors influencing e-learning adoption.

H5: There exists a relationship between Academic qualification and factors influencing e-learning adoption (self efficacy, ease of use, content quality, learning culture, learning motivation, pre-training attitude, computer anxiety, internet experience, subjective norms and usefulness).

Table 5.24 IT professionals Academic Qualification vs. Factors influencing E-learning adoption

ANOVA

Academic Qualification	Mean Squares		F Ratio	Sig	Hypothesis Result
	Between Groups	Within Groups			
Self efficacy	1.554	.339	4.587	0.011	**Accepted**
Ease of use	0.252	0.192	1.314	0.27	Rejected
Content quality	0.146	0.28	0.52	0.595	Rejected
Learning Culture	0.232	0.21	1.105	0.332	Rejected
Learning motivation	0.146	0.252	0.58	0.56	Rejected
Pre-training attitude	2.121	0.408	5.204	0.006	**Accepted**
computer anxiety	0.534	0.678	0.787	0.456	Rejected
Internet experience	0.879	0.266	3.301	0.038	**Accepted**
Subjective norms	0.051	0.25	0.204	0.815	Rejected
Usefulness	0.046	0.269	0.172	0.842	Rejected

F statistically significant ($p<.05$)

From the above ANOVA table F significant value of self-efficacy is .011 (which is less than 0.05), so the **alternative hypothesis has been accepted**. This implies that there is a significant relationship between academic qualification of an IT professional and the factor self-efficacy.

H5a: There exists a relationship between Academic qualification and self efficacy of the learner

Result: Accepted

ANOVA table above shows F significant value of ease of use is .27 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between academic qualification of an IT professional and the factor ease of use as perceived by the user.

H5b: There exists a relationship between Academic qualification and ease of use as perceived by user

Result: Rejected

F significant value of content quality is .595 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between academic qualification of an IT professional and the factor content quality as perceived by the user.

H5c There exists a relationship between Academic qualification and content quality of e-learning

Result: Rejected

F significant value of learning culture is .332 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between academic qualification of an IT professional and the factor organizational learning culture as perceived by the user.

H5d There exists a relationship between Academic qualification and learning culture of organization

Result: Rejected

F significant value of learning motivation is culture is .56 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between academic qualification of an IT professional and the factor learning motivation as perceived by the user.

H5e There exists a relationship between Academic qualification and learning motivation of the learner

Result: Rejected

According to the above table F significant value of pre-training attitude of learner is .006 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between academic qualification of an IT professional and the factor pre-training attitude of the learner motivation as responded by the user.

H5f There exists a relationship between Academic qualification and pre-training attitude of the learner

Result: Accepted

F significant value of computer anxiety is .456 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between academic qualification of an IT professional and the factor computer anxiety as perceived by the user.

H5g There exists a relationship between Academic qualification and computer anxiety

Result: Rejected

According to the above table F significant value of internet experience of learner is .038 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between academic qualification of an IT professional and the factor internet experience of the learner.

H5h There exists a relationship between Academic qualification and internet experience of the learner

Result: Accepted

F significant value of subjective norms is .815 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between academic qualification of an IT professional and the factor subjective norms as perceived by the user.

H5i There exists a relationship between Academic qualification and subjective norms as perceived by learner

Result: Rejected

F significant value of usefulness of e-learning is .842 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between academic qualification of an IT professional and the factor usefulness of e-learning as perceived by the user.

H5j There exists a relationship between Academic qualification and usefulness of e-learning
Result: Rejected

Variation in e-learning factors in relation to Number of online courses

To analyze if there is statistically significant difference between the means of various factors of e-learning adoption and e-learning effectiveness in relation to number of online courses taken by learner ANOVA test has been used. Hypothesis H6 has been formulated to analyze the variation of e-learning factors. Table 5.25 represents the ANOVA results.

H6: There exists a relationship between Number of online courses of respondent and factors contributing to e-learning effectiveness

Table 5.25 IT professionals Number of online courses vs. Factors contributing to E-learning effectiveness- ANOVA

Number of online courses	Mean Squares		F Ratio	Sig	Hypothesis Results
	Between Groups	Within Groups			
Achievement and satisfaction	.284	.190	1.493	.203	Rejected
Perceived E-learning effectiveness	.110	.124	.886	.472	Rejected
E-learning transfer	.456	.209	2.177	.071	Rejected

F statistically significant ($p<.05$)

From the above ANOVA table F significant value of Achievement and satisfaction is .203 (which is more than 0.05), so we reject alternative hypothesis. It means that there is no significant

difference in means among the respondents' number of online courses taken with respect to achievement and satisfaction acquired through e-learning. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor achievement and satisfaction.

H6a: There exists a relationship between number of online courses taken by the respondent and achievement and satisfaction
Result: Rejected

Similarly, from the above ANOVA table F significant value of perceived e-learning effectiveness is .472 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by the user and the factor perceived e-learning effectiveness.

H6b: There exists a relationship between number of online courses taken by the respondent and perceived e-learning effectiveness
Result: Rejected

Also, from the above ANOVA table F significant value of perceived e-learning transfer is .071 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor e-learning transfer.

H6c: There exists a relationship between number of online courses taken by respondent and e-learning transfer
Result: Rejected

Table 5.26 represents the ANOVA results analyzing the relationship between number of online courses taken by the learner and factors influencing e-learning adoption. Hypothesis 7 has been

formulated to analyze the relationship between number of online courses taken by learner and various factors influencing e-learning adoption.

H7: There exists a relationship between Number of online courses taken by the learner and factors influencing e-learning adoption (self-efficacy, ease of use, content quality, learning culture, learning motivation, pre-training attitude, computer anxiety, internet experience, subjective norms and usefulness).

Table 5.26 IT professionals Number of online courses vs. Factors contributing to E-learning effectiveness- ANOVA

Number of online courses	Mean Squares		F Ratio	Sig	Hypothesis Result
	Between Groups	Within Groups			
Self efficacy	.222	.346	.641	.634	Rejected
Ease of use	.099	0.193	.511	.728	Rejected
Content quality	0.053	0.282	.188	.945	Rejected
Learning Culture	0.400	0.208	1.920	.106	Rejected
Learning motivation	0.474	0.250	1.899	.110	Rejected
Pre-training attitude	.524	0.415	1.263	.284	Rejected
computer anxiety	1.168	0.673	1.736	.141	Rejected
Internet experience	.918	.263	3.492	.008	**Accepted**
Subjective norms	.527	.246	2.141	.075	Rejected
Usefulness	.556	.265	2.100	.080	Rejected

F statistically significant (p<.05)

From the above ANOVA table F significant value of self-efficacy is .634 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor self-efficacy.

H7a: There exists a relationship between Number of online courses taken and self-efficacy of the learner

Result: Rejected

ANOVA table above shows F significant value of ease of use is .728 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor ease of use as perceived by the user.

H7b: There exists a relationship between Number of online courses taken and ease of use as perceived by user

Result: Rejected

F significant value of content quality is .945 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor content quality as perceived by the user.

H7c: There exists a relationship between Number of online courses taken and content quality of e-learning

Result: Rejected

F significant value of learning culture is .106 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between number of online courses taken by an IT professional and the factor organizational learning culture as perceived by the user.

H7d: There exists a relationship between Number of online courses taken and learning culture of organization

Result: Rejected

F significant value of learning motivation is .110 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between number of online courses taken by an IT professional and the factor learning motivation as perceived by the user.

H7e There exists a relationship between Number of online courses taken and learning motivation of the learner

Result: Rejected

According to the above table F significant value of pre-training attitude of learner is .284 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between number of online courses taken by an IT professional and the factor pre-training attitude as responded by the user.

H7f There exists a relationship between Number of online courses taken and pre-training attitude of the learner

Result: Rejected

F significant value of computer anxiety is .141 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between number of online courses taken by an IT professional and the factor computer anxiety as perceived by the user.

H7g There exists a relationship between Number of online courses taken and computer anxiety

Result: Rejected

According to the above table F significant value of internet experience of learner is .008 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between number of online courses taken by an IT professional and the factor internet experience.

H7h There exists a relationship between Number of online courses taken and internet experience of the learner

Result: Accepted

F significant value of subjective norms is .075 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between number of online courses taken by an IT professional and the factor subjective norms as perceived by the user.

H7i There exists a relationship between Number of online courses taken and subjective norms as perceived by learner

Result: Rejected

F significant value of usefulness of e-learning is .080 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between number of online courses taken by an IT professional and the factor usefulness of e-learning as perceived by the user.

H7j There exists a relationship between Number of online courses taken and usefulness of e-learning

Result: Rejected

Variation in e-learning factors in relation to Age of the learner

To understand if there is statistically significant difference between the means of various factors of e-learning adoption and e-learning effectiveness in relation to age of the learner ANOVA test has been used. Hypothesis H8 has been formulated to analyze the variation of e-learning factors. Table 5.27 presents ANOVA results.

H8: There exists a relationship between Age of respondent and factors contributing to e-learning effectiveness

Table 5.27 IT professionals Age vs. Factors contributing to E-learning effectiveness ANOVA

Age of the learner	Mean Squares		F Ratio	Sig	Hypothesis Results
	Between Groups	Within Groups			
Achievement and satisfaction	.026	.192	.134	.875	Rejected
Perceived E-learning effectiveness	.380	.122	3.115	.046	**Accepted**
E-learning transfer	.726	.209	3.469	.032	**Accepted**

F statistically significant (p<.05)

From the above ANOVA table F significant value of Achievement and satisfaction is .875 (which is more than 0.05), so we reject alternative hypothesis. It means that there is no significant difference in means among the respondents' age with respect to achievement and satisfaction acquired through e-learning. This implies that there is no significant relationship between age of an IT professional and the factor achievement and satisfaction.

H8a: There exists a relationship between age of the respondent and achievement and satisfaction

Result: Rejected

Similarly, from the above ANOVA table F significant value of perceived e-learning effectiveness is .046 (which is less than 0.05), so we accept alternative hypothesis. This implies that there is a significant relationship between age of the user and the factor perceived e-learning effectiveness.

H8b: There exists a relationship between age of the respondent and perceived e-learning effectiveness

Result: Accepted

Also, from the above ANOVA table F significant value of perceived e-learning transfer is .032 (which is less than 0.05), so we accept alternative hypothesis. This implies that there is a significant relationship between age of an IT professional and the factor e-learning transfer.

H8c: There exists a relationship between age of the respondent and e-learning transfer

Result: Accepted

Table 5.28 represents the ANOVA results analyzing the relationship between age of the learner and factors influencing e-learning adoption. Hypothesis 9 has been formulated to analyze the relationship between age and various factors influencing e-learning adoption.

H9: There exists a relationship between age of the learner and factors influencing e-learning adoption (self-efficacy, ease of use, content quality, learning culture, learning motivation, pre-training attitude, computer anxiety, internet experience, subjective norms and usefulness).

Table 5.28 IT professionals Age vs. Factors contributing to E-learning effectiveness ANOVA

Age of the learner	Mean Squares		F Ratio	Sig	Hypothesis Result
	Between Groups	Within Groups			
Self efficacy	.003	.347	.007	.993	Rejected
Ease of use	.074	0.193	.385	.681	Rejected
Content quality	0.093	0.281	.333	.717	Rejected
Learning Culture	1.044	.206	5.067	.007	**Accepted**
Learning motivation	.345	.251	1.373	.255	Rejected
Pre-training attitude	0.054	0.418	.130	.878	Rejected
computer anxiety	2.215	.670	3.307	.038	**Accepted**
Internet experience	1.735	.262	6.624	.001	**Accepted**
Subjective norms	1.306	.244	5.360	.005	**Accepted**
Usefulness	2.501	.256	9.766	.000	**Accepted**

F statistically significant (p<.05)

From the above ANOVA table F significant value of self-efficacy is .993 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between age of an IT professional and the factor self-efficacy.

H9a: There exists a relationship between Age and self-efficacy of the learner
Result: Rejected

ANOVA table above shows F significant value of ease of use is .681 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between age of an IT professional and the factor ease of use as perceived by the user.

H9b: There exists a relationship between Age and ease of use as perceived by user
Result: Rejected

F significant value of content quality is .717 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between age of an IT professional and the factor content quality as perceived by the user.

H9c: There exists a relationship between Age and content quality of e-learning
Result: Rejected

F significant value of learning culture is .007 (which is less than 0.05), so we accept alternative hypothesis. Hence there is a significant relationship between age of an IT professional and the factor organizational learning culture as perceived by the user.

H9d: There exists a relationship between Age and learning culture of organization
Result: Accepted

F significant value of learning motivation is .255 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between age of an IT professional and the factor learning motivation as perceived by the user.

H9e: There exists a relationship between Age and learning motivation of the learner
Result: Rejected

According to the above table F significant value of pre-training attitude of learner is .878 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between Age of an IT professional and the factor pre-training attitude as responded by the user.

H9f: There exists a relationship between Age and pre-training attitude of the learner
Result: Rejected

F significant value of computer anxiety is .038 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between age of an IT professional and the factor computer anxiety as perceived by the user.

H9g There exists a relationship between Age and computer anxiety of the learner
Result: Accepted

According to the above table F significant value of internet experience of learner is .001 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between age of an IT professional and the factor internet experience.

H9h There exists a relationship between Age and internet experience of the learner
Result: Accepted

F significant value of subjective norms is .005 (which is less than 0.05), so we accept alternative hypothesis. This implies that there is a significant relationship between age of an IT professional and the factor subjective norms as perceived by the user.

H9i There exists a relationship between Age and subjective norms as perceived by learner
Result: Accepted

F significant value of usefulness of e-learning is .000 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between age of an IT professional and the factor usefulness of e-learning as perceived by the user.

H9j There exists a relationship between Age and usefulness of e-learning

Result: Accepted

Variation in e-learning factors in relation to Level of management of the learner

To understand if there is statistically significant difference between the means of various factors of e-learning adoption and e-learning effectiveness in relation to age of the learner ANOVA test has been used. Hypothesis H10 has been formulated to analyze the variation of e-learning factors. Table 5.29 presents ANOVA results.

H10: There exists a relationship between level of management of respondent and factors contributing to e-learning effectiveness

Table 5.29 IT professionals level of management vs. Factors contributing to E-learning effectiveness- ANOVA

Level of Management	**Mean Squares**		**F Ratio**	**Sig**	**Hypothesis Results**
	Between Groups	Within Groups			
Achievement and satisfaction	.252	.191	1.324	.267	Rejected
Perceived E-learning effectiveness	.207	.123	1.681	.188	Rejected
E-learning transfer	.537	.210	2.552	.079	Rejected

F statistically significant (p<.05)

From the above ANOVA table F significant value of Achievement and satisfaction is .267 (which is more than 0.05), so we reject alternative hypothesis. It means that there is no significant

difference in means among the respondents' level of management with respect to achievement and satisfaction acquired through e-learning. This implies that there is no significant relationship between level of management of an IT professional and the factor achievement and satisfaction.

H10a: There exists a relationship between level of management of the respondent and achievement and satisfaction

Result: Rejected

Similarly, from the above ANOVA table F significant value of perceived e-learning effectiveness is .188 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between level of management of the user and the factor perceived e-learning effectiveness.

H10b: There exists a relationship between level of management of the respondent and perceived e-learning effectiveness

Result: Rejected

Also, from the above ANOVA table F significant value of perceived e-learning transfer is .079 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between level of management of an IT professional and the factor e-learning transfer.

H10c: There exists a relationship between level of management of the respondent and e-learning transfer

Result: Rejected

Table 5.29 represents the ANOVA results analyzing the relationship between level of management of the learner and factors influencing e-learning adoption. Hypothesis 11 has been formulated to analyze the relationship between age and various factors influencing e-learning adoption.

H11: There exists a relationship between level of management of the learner and factors influencing e-learning adoption (self efficacy, ease of use, content quality, learning culture,

learning motivation, pre-training attitude, computer anxiety, internet experience, subjective norms and usefulness).

Table 5.30 IT professionals Level of Management vs. Factors contributing to E-learning effectiveness- ANOVA

Level of Management	Mean Squares		F Ratio	Sig	Hypothesis Result
	Between Groups	Within Groups			
Self efficacy	.462	.345	1.340	.263	Rejected
Ease of use	.496	.191	2.599	.076	Rejected
Content quality	.182	.280	.652	.522	Rejected
Learning Culture	.330	.210	1.574	.209	Rejected
Learning motivation	.160	.252	.633	.532	Rejected
Pre-training attitude	1.358	0.412	3.300	.038	**Accepted**
computer anxiety	1.933	.671	2.880	.057	Rejected
Internet experience	.341	.269	1.266	.283	Rejected
Subjective norms	.500	.248	2.016	.135	Rejected
Usefulness	.315	.267	1.177	.309	Rejected

F statistically significant (p<.05)

From the above ANOVA table F significant value of self efficacy is .263 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between level of management of the learner and the factor self efficacy.

H11a: There exists a relationship between level of management and self efficacy of the learner

Result: Rejected

ANOVA table above shows F significant value of ease of use is .076 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between level of management of the learner and the factor ease of use as perceived by the user.

H11b: There exists a relationship between level of management and ease of use as perceived by user

Result: Rejected

F significant value of content quality is .522 (which is more than 0.05), so we reject alternative hypothesis. This implies that there is no significant relationship between level of management of the learner and the factor content quality as perceived by the user.

H11c: There exists a relationship between level of management of learner and content quality of e-learning

Result: Rejected

F significant value of learning culture is .209 (which is more than 0.05), so we reject alternative hypothesis. Hence there is no significant relationship between level of management of the learner and the factor organizational learning culture as perceived by the user.

H11d: There exists a relationship between level of management of learner and learning culture of organization

Result: Rejected

F significant value of learning motivation is .532 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between level of management of the learner and the factor learning motivation as perceived by the user.

H11e: There exists a relationship between level of management and learning motivation of the learner

Result: Rejected

According to the above table F significant value of pre-training attitude of learner is .038 (which is less than 0.05), so we accept alternative hypothesis. And hence there is a significant relationship between level of management of the learner and the factor pre-training attitude as responded by the user.

H11f: There exists a relationship between level of management and pre-training attitude of the learner

Result: Accepted

F significant value of computer anxiety is .057 (which is more than 0.05), so we reject alternative hypothesis. And hence there is no significant relationship between level of management of the learner and the factor computer anxiety as perceived by the user.

H11g: There exists a relationship between level of management and computer anxiety of the learner

Result: Rejected

According to the above table F significant value of internet experience of learner is .283 (which is more than 0.05), so we accept alternative hypothesis. And hence there is no significant relationship between level of management of the learner and the factor internet experience.

H11h: There exists a relationship between level of management and internet experience of the learner

Result: Rejected

F significant value of subjective norms is .135 (which is more than 0.05), so we accept alternative hypothesis. This implies that there is no significant relationship between level of management of the learner and the factor subjective norms as perceived by the user.

H11i: There exists a relationship between level of management and subjective norms as perceived by learner

Result: Rejected

F significant value of usefulness of e-learning is .309 (which is more than 0.05), so we accept alternative hypothesis. And hence there is no significant relationship between level of management of the learner and the factor usefulness of e-learning as perceived by the user.

H11j: There exists a relationship between level of management of learner and usefulness of e-learning

Result: Rejected

Variation in e-learning factors in relation to gender of the learner

To assess the relationship of various e-learning factors studied with gender, Chi-square test has been performed. Hypothesis 12 aims at analyzing if there is a relationship between gender of the respondent and factors influencing e-learning adoption. Chi-square Test done with the sample yielded following results as presented in Table 5.31

H12: There exists a relationship between gender of the learner and factors influencing e-learning adoption

Table 5.31 Chi Square test of Gender and factors influencing e-learning adoption

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
E-learning interactivity	2.238	.524	Rejected
Learning culture	6.871	.076	Rejected
Learning motivation	14.489	.001	Accepted
Subjective Norms	.333	.954	Rejected
Usefulness	.643	.886	Rejected
Computer Anxiety	1.466	.690	Rejected
Internet experience	2.297	.317	Rejected

From the above table, E-learning interactivity Chi-Square significance value is .524 which is more than the alpha value of .05 (sig. value is 0.524 > 0.05), so alternative hypothesis is rejected. This

shows there is no significant association between gender and their opinions on e-learning interactivity

H12a: There is a significant association between gender and their opinions on e-learning interactivity

Result: Rejected

From the above table, Learning culture Chi-Square significance value is .076 which is more than the alpha value of .05 (sig. value is 0.076> 0.05), so alternative hypothesis is rejected. This shows there is no significant association between gender and their opinions on organizational learning culture.

H12b: There is a significant association between gender and their opinions on learning culture

Result: Rejected

From the above table, Learning motivation Chi-Square significance value is .001 which is more than the alpha value of .05(sig. value is 0.001 < 0.05), so alternative hypothesis is accepted. It means that there is a significant association between gender and their opinions on learning motivation.

H12c: There is a significant association between gender and their opinions on learning motivation

Result: Accepted

From the above table, subjective norms Chi-Square significance value is .954 which is more than the alpha value of .05 (sig. value is 0.954 > 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and subjective norms as perceived by them.

H12d: There is a significant association between gender and their opinions on subjective norms

Result: Rejected

From the above table, Usefulness Chi-Square significance value is .886 which is more than the alpha value of .05 (sig. value is 0.886 > 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and subjective norms as perceived by them.

H12e: There is a significant association between gender and their opinions on subjective norms

Result: Rejected

From the above table, Chi-Square significance value of computer anxiety is .690 which is more than the alpha value of .05 (sig. value is 0.690> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and computer anxiety perceived by them.

H12f: There is a significant association between gender and their opinions on computer anxiety

Result: Rejected

From the above table, Chi-Square significance value of internet experience is .317 which is more than the alpha value of .05 (sig. value is 0.317> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and internet experience as perceived by them.

H12g: There is a significant association between gender and their opinions on internet experience

Result: Rejected

Hypothesis 13 aims at analyzing if there is a relationship between gender of the respondent and factors contributing to e-learning effectiveness. Chi-square Test done with the sample yielded following results as presented in Table 5.32

Table 5.32 Chi Square test of Gender and factors contributing to e-learning effectiveness

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
Achievement and satisfaction	2.705	.439	Rejected
Perceived e-learning effectiveness	2.169	.338	Rejected
E-learning transfer	2.956	.398	Rejected

From the above table, Achievement and satisfaction Chi-Square significance value is .439 which is more than the alpha value of .05 (sig. value is 0.439> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and achievement and satisfaction through e-learning as perceived by them.

H13a: There is a significant association between gender and their opinions on achievement and **satisfaction through e-learning**

Result: Rejected

From the above table, Chi-Square significance value of perceived e-learning effectiveness is .338 which is more than the alpha value of .05 (sig. value is 0.338> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and perceived e-learning effectiveness.

H13b: There is a significant association between gender and their opinions on perceived e-learning effectiveness

Result: Rejected

From the above table, Chi-Square significance value of e-learning transfer is .398 which is more than the alpha value of .05 (sig. value is 0.398> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between gender and e-learning transfer as perceived by learners.

H13c: There is a significant association between gender and their opinions on e-learning transfer

Result: Rejected

Variation in e-learning factors in relation to learner's prior exposure to e-learning

To assess the relationship of various e-learning factors studied with prior exposure to e-learning of the learner, Chi-square test has been performed. Hypothesis 14 aims at analyzing if there is a relationship between learner's prior exposure to e-learning and factors influencing e-learning adoption. Chi-square Test done with the sample yielded following results as presented in Table 5.33

H14: There exists a relationship between learner's prior exposure to e-learning and factors influencing e-learning adoption

Table 5.33 Chi Square test of prior exposure to e-learning & factors influencing e-learning adoption

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
E-learning interactivity	2.371	.499	Rejected
Learning culture	2.357	.502	Rejected
Learning motivation	.133	.936	Rejected
Subjective Norms	1.429	.699	Rejected
Usefulness	1.943	.584	Rejected
Computer Anxiety	8.444	.038	Accepted
Internet experience	3.827	.148	Rejected

From the above table, E-learning interactivity Chi-Square significance value is .499which is more than the alpha value of .05 (sig. value is 0.499> 0.05), so alternative hypothesis is rejected. This

shows there is no significant association between learner's prior exposure to e-learning and their opinions on e-learning interactivity

H14a: There is a significant association between learner's prior exposure to e-learning and their opinions on e-learning interactivity

Result: Rejected

From the above table, Learning culture Chi-Square significance value is .502which is more than the alpha value of .05 (sig. value is 0.502> 0.05), so alternative hypothesis is rejected. This shows there is no significant association between learner's prior exposure to e-learning and their opinions on organizational learning culture.

H14b: There is a significant association between learner's prior exposure to e-learning and their opinions on learning culture

Result: Rejected

From the above table, Learning motivation Chi-Square significance value is .936which is more than the alpha value of .05 (sig. value is 0.936< 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and their opinions on learning motivation.

H14c: There is a significant association between learner's prior exposure to e-learning and their opinions on learning motivation

Result: Rejected

From the above table, subjective norms Chi-Square significance value is .699which is more than the alpha value of .05 (sig. value is 0.699> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and subjective norms as perceived by them.

H14d: There is a significant association between learner's prior exposure to e-learning and their opinions on subjective norms

Result: Rejected

From the above table, Chi-Square significance value of Usefulness is .584which is more than the alpha value of .05 (sig. value is 0.584> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and usefulness of e-learning as perceived by them.

H14f: There is a significant association between learner's prior exposure to e-learning and their opinions on usefulness

Result: Rejected

From the above table, computer anxiety Chi-Square significance value is .038 which is less than the alpha value of .05 (sig. value is 0.038< 0.05), so alternative hypothesis is accepted. It means that there is a significant association between learner's prior exposure to e-learning and computer anxiety as perceived by them.

H14e: There is a significant association between learner's prior exposure to e-learning and their opinions on computer anxiety

Result: Accepted

From the above table, Chi-Square significance value of internet experience is .148which is more than the alpha value of .05 (sig. value is 0.148> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and internet experience as perceived by them.

H14g: There is a significant association between learner's prior exposure to e-learning and their opinions on internet experience

Result: Rejected

Hypothesis 15 aims at analyzing if there is a relationship between learner's prior exposure to e-learning and factors contributing to e-learning effectiveness. Chi-square Test done with the sample yielded following results as presented in Table 5.34

Table 5.34 Chi Square test of learners' prior exposure to e-learning and factors contributing to e-learning effectiveness

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
Achievement and satisfaction	3.935	.269	Rejected
Perceived e-learning effectiveness	1.346	.510	Rejected
E-learning transfer	1.097	.778	Rejected

From the above table, Achievement and satisfaction Chi-Square significance value is .269 which is more than the alpha value of .05 (sig. value is 0.269> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and achievement and satisfaction through e-learning as perceived by them.

H15a: There is a significant association between learner's prior exposure to e-learning and their opinions on achievement and satisfaction through e-learning

Result: Rejected

From the above table, Chi-Square significance value of perceived e-learning effectiveness is .510which is more than the alpha value of .05 (sig. value is 0.510> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's prior exposure to e-learning and perceived e-learning effectiveness.

H15b: There is a significant association between learner's prior exposure to e-learning and their opinions on perceived e-learning effectiveness

Result: Rejected

From the above table, Chi-Square significance value of e-learning transfer is .778 which is more than the alpha value of .05 (sig. value is 0.778> 0.05), so alternative hypothesis is rejected. It

means that there is no significant association between learner's prior exposure to e-learning and e-learning transfer as perceived by learners.

H15c: There is a significant association between learner's prior exposure to e-learning and their opinions on e-learning transfer

Result: Rejected

Variation in e-learning factors in relation to medium of education of the learner

Hypothesis 16 aims at analyzing if there is a relationship between learner's medium of education and factors influencing e-learning adoption. Chi-square Test done with the sample yielded following results as presented in Table 5.35

H16: There exists a relationship between learner's medium of education and factors influencing e-learning adoption

Table 5.35 Chi Square test of learner's medium of education & factors influencing e-learning adoption

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
E-learning interactivity	1.945	.584	Rejected
Learning culture	.220	.974	Rejected
Learning motivation	.576	.750	Rejected
Subjective Norms	2.827	.419	Rejected
Usefulness	.519	.915	Rejected
Computer Anxiety	.049	.997	Rejected
Internet experience	.429	.807	Rejected

From the above table, E-learning interactivity Chi-Square significance value is .584which is more than the alpha value of .05 (sig. value is 0.584> 0.05), so alternative hypothesis is rejected. This shows there is no significant association between learner's medium of education and their opinions on e-learning interactivity

H16a: There is a significant association between learner's medium of education and their opinions on e-learning interactivity

Result: Rejected

From the above table, Learning culture Chi-Square significance value is .974which is more than the alpha value of .05 (sig. value is 0.974> 0.05), so alternative hypothesis is rejected. This shows there is no significant association between learner's medium of education and their opinions on organizational learning culture.

H16b: There is a significant association between learner's medium of education and their opinions on learning culture

Result: Rejected

From the above table, Learning motivation Chi-Square significance value is .750which is more than the alpha value of .05 (sig. value is 0.750< 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's medium of education and their opinions on learning motivation.

H16c: There is a significant association between learner's medium of education and their opinions on learning motivation

Result: Rejected

From the above table, subjective norms Chi-Square significance value is .419which is more than the alpha value of .05 (sig. value is 0.419> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's medium of education and subjective norms as perceived by them.

H16d: There is a significant association between learner's medium of education and their opinions on subjective norms

Result: Rejected

From the above table, Chi-Square significance value of Usefulness is .915which is more than the alpha value of .05 (sig. value is 0.915> 0.05), so alternative hypothesis is rejected. It means that

there is no significant association between learner's medium of education and usefulness of e-learning as perceived by them.

H16e: There is a significant association between learner's medium of education and their opinions on computer anxiety

Result: Rejected

From the above table, computer anxiety Chi-Square significance value is .997which is less than the alpha value of .05 (sig. value is 0.997> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learners' medium of education and computer anxiety as perceived by them.

H16f: There is a significant association between learner's medium of education and their opinions on computer anxiety

Result: Rejected

From the above table, Chi-Square significance value of internet experience is .807which is more than the alpha value of .05 (sig. value is 0.807> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's medium of education and internet experience as perceived by them.

H16g: There is a significant association between learner's medium of education and their opinions on internet experience

Result: Rejected

Hypothesis 17 aims at analyzing if there is a relationship between learner's medium of education and factors contributing to e-learning effectiveness. Chi-square Test done with the sample yielded following results as presented in Table 5.36

Table 5.36 Chi Square test of learner's medium of education and factors contributing to e-learning effectiveness

E-learning Factor	Pearson Chi-Square value	Asymp. Sig. (2-sided)	Hypothesis Result
Achievement and satisfaction	2.948	.400	Rejected
Perceived e-learning effectiveness	.672	.715	Rejected
E-learning transfer	.218	.975	Rejected

From the above table, Achievement and satisfaction Chi-Square significance value is .400which is more than the alpha value of .05 (sig. value is 0.400> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's medium of education and achievement and satisfaction through e-learning as perceived by them.

H17a: There is a significant association between learner's medium of education and their opinions on achievement and satisfaction through e-learning

Result: Rejected

From the above table, Chi-Square significance value of perceived e-learning effectiveness is .715which is more than the alpha value of .05 (sig. value is 0.715> 0.05), so alternative hypothesis is rejected. It means that there is no significant association between learner's medium of education and perceived e-learning effectiveness.

H17b: There is a significant association between learner's medium of education and their opinions on perceived e-learning effectiveness

Result: Rejected

From the above table, Chi-Square significance value of e-learning transfer is .975which is more than the alpha value of .05 (sig. value is 0.975> 0.05), so alternative hypothesis is rejected. It

means that there is no significant association between learner's medium of education and e-learning transfer as perceived by learners.

H17c: There is a significant association between learner's medium of education and their opinions on e-learning transfer

Result: Rejected

Medium of education has as such no impact on any of the e-learning factors studied. Once into the industry, it is evident that they develop the required skills to adapt to the existing IT environment.

5.7.3 Moderating effect of factors influencing e-learning adoption on factors contributing to e-learning effectiveness

To explain the relationship between two sets of variables in the current study, regression analysis is performed. The dependent variables of the study being contributing factors to e-learning effectiveness, the independent variables of the study are the factors influencing e-learning adoption. Dependent variables of this regression analysis: Achievement and satisfaction, Perceived e-learning effectiveness and E-learning transfer. Independent variables of this regression analysis: E-learning interactivity, Learning culture, Learning motivation, Subjective norms, usefulness and computer anxiety.

Moderating effect of factors influencing e-learning adoption on Achievement and Satisfaction

First factor of e-learning effectiveness factor, achievement and satisfaction is included in regression analysis with other independent variables of this analysis. Table 5.37 depicts the relationship between the chosen set of variables.

Table 5.37 Regression results for Achievement and satisfaction

Influencing Factors	**R**	**R^2**	**Mean Square**		**F**	**Un-standardized coefficients**	**Standardized coefficients**		
			Regression	**Residual**		**B**	**Beta**	**t**	**Sig**
	.518	.268	3.307	.142	23.294				
(Constant)						.590		4.512	.000
E-learning Interactivity						.046	.043	.831	.406
Learning Culture						.260	.273	5.542	.000
Learning motivation						.096	.112	2.222	.027
Subjective Norms						.050	.057	1.176	.241
Usefulness						.192	.227	4.419	.000
Computer anxiety						.080	.150	3.242	.001

p<.05

Equation: Achievement and satisfaction= .590+ .046(E-learning Interactivity)+ .260(learning culture)+.096(Learning motivation)+ .050(subjective norms)+ .192(usefulness)+ .080(Computer anxiety)

From the above table R value of 0.518 indicates that dependent variable achievement and satisfaction has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, usefulness and computer anxiety. 26.8% of achievement and satisfaction is explained by given independent variables.

Moderating effect of factors influencing e-learning adoption on Perceived e-learning effectiveness

Second factor of perceived e-learning effectiveness factor, perceived e-learning effectiveness is included in regression analysis with other independent variables of this analysis. Table 5.38 depicts the relationship between the chosen set of variables and perceived e-learning effectiveness.

Table 5.38 Regression results for perceived e-learning effectiveness

Influencing Factors	**R**	**R^2**	**Mean Square**		**F**	**Un-standardized coefficients**	**Standardized coefficients**		
			Regression	**Residual**		**B**	**Beta**	**t**	**Sig**
	.634	.401	3.205	.075	42.625				
(Constant)						.694		7.303	.000
E-learning Interactivity						.009	.010	.222	.825
Learning Culture						.240	.314	7.050	.000*
Learning motivation						.058	.084	1.838	.067
Subjective Norms						.132	.188	4.277	.000*
Usefulness						.189	.278	5.974	.000*
Computer anxiety						.069	.162	3.874	.000*

p<.05

Equation: E-learning effectiveness= .694+ .009(E-learning Interactivity)+ .240(Learning culture)+.058(Learning motivation)+ .132(subjective norms)+ .189(usefulness)+ .069(Computer anxiety)

From the above table, R value of 0.634 indicates that dependent variable e-learning effectiveness has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, usefulness and computer anxiety. 40.1% of e-learning effectiveness is explained by given independent variables.

Moderating effect of factors influencing e-learning adoption on E-learning transfer

Third factor of e-learning effectiveness factor, e-learning transfer is included in regression analysis with other independent variables of this analysis. Table 5.39 depicts the relationship between the chosen set of variables and perceived e-learning effectiveness.

Table 5.39 Regression results for E-learning transfer

Influencing Factors	**R**	**R^2**	**Mean Square**		**F**	**Un-standardized coefficients**	**Standardized coefficients**		
			Regression	**Residual**		**B**	**Beta**	**t**	**Sig**
	.579	.336	4.603	.143	32.178				
(Constant)						.422		3.218	.001
E-learning Interactivity						.039	.034	.693	.489
Learning Culture						.327	.326	6.950	.000

Influencing Factors	R	R^2	Mean Square		F	Un-standardized coefficients	Standardized coefficients		
Learning motivation						.103	.115	2.393	.017
Subjective Norms						.189	.205	4.434	.000
Usefulness						.173	.194	3.971	.000
Computer anxiety						.033	.060	1.355	.176

p<.05

Equation: E-learning transfer= .422+ .039(E-learning Interactivity) + .327(Learning culture)+.103(Learning motivation)+ .189(subjective norms)+ .173(usefulness)+ .033(Computer anxiety)

From the above table, R value of 0.579 indicates that dependent variable e-learning transfer has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, usefulness and computer anxiety. 33.6% of e-learning transfer is explained by given independent variables.

This analysis shows that the factors influencing e-learning adoption have a moderating effect on the factors contributing to e-learning effectiveness.

5.8 Factor Analysis

For the purpose of this study, Bartlett's Test of Sphericity and the Kaiser-Meyer- Olkin measure of sampling adequacy (KMO) to gauge the factor-analyzability of the data was done. From the table 5.40 it can be seen that KMO measure of 0.855 is acceptable as it is more than 0.5, which is considered to be 'good' quality. Hence factor analysis appropriateness is assured for the given sample. Bartlett's Test of Sphericity indicates a measure of the multivariate normality of set of variables (Sig. value is less than 0.05 indicates multivariate normal and acceptable for factor

analysis. For this test, the significance level in Bartlett's test is .000 and hence highly significant. The factor analysis in this case is therefore considered appropriate.

Table 5.40 KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.855
Bartlett's Test of Sphericity	Approx. Chi-Square	16237.320
	df	2926
	Sig.	.000

The data collected was subjected to factor analysis by the principal component factor analysis with Varimax Rotation by using the criterion that factors with Eigen value > 1.00 were retained. **Loadings exceeding 0.5** were considered for determining factors. The literature on the factor analysis allows a loading of 0.33 to be the minimum value for inclusion. This criterion is being used more or less by way of convention (Vasanthi and Rayappan, 2006) (Table – 5.40)

First factor in the rotated component matrix is heavily loaded with '**Job performance has improved since completing that e-learning training program'**. Factor loading Values of 0.716, it is the highest for the first factor. The first factor represents job performance has improved since completing that e-learning training program. This factor is accounting to almost 20.25% of variance. The second factor is heavily loaded with the item '**E-learning courses covered things wanted to learn'** (0.736) and '**I believe e-learning contents are of right level'** (0.787) and depth of the subsequent factors can be interpreted based on their factor loading values. The final list of 20 factors which collectively account for 68 % of the variance in the data is shown in Table 5.41 below.

Table 5.41 Variable loadings of e-learning factors by the Varimax Rotated Principal Components

Factor- 1 – e learning	Factor Loadings	Eigen Value	Variance (in %)
My job performance has improved since completing that e-learning training program. Factor-2 – Content	0.716	15.595	20.253
The e-learning courses covered things I wanted to learn	0.787	6.251	8.118
I believe e-learning contents are of right level and depth Factor – 3- Learning Experience	0.736		
E-learning made me more responsible for my own learning than I usually am	0.815	2.937	3.814
In always consider e-learning as a valuable and constructive learning experience	0.858		
Having used e-learning, I would recommend it to my colleagues to use it for study purposes	0.859		
I give 100% effort to learn as much possible during the training given in the organization	0.878		
Logical arrangement and presenting in understandable chunks would enhance learning	0.725	2.890	3.753
Opportunity to practice or experiment can enhance user friendliness	0.704		
The most satisfying thing for me is trying to	0.771		

Factor- 1 – e learning	Factor Loadings	Eigen Value	Variance (in %)
understand the content as thoroughly as possible		2.500	3.246
I think learning is always a good chance to improve my task ability	0.709		
Organization can use internet effectively for training and development	0.791	2.438	3.166
I spend many hours using internet	0.755		
Usage of internet has influenced my life in a positive way	0.731		
Rewards and/or recognition from my employer for taking e-learning is important for me	0.756	2.321	3.014
E-learning participation being factored into my performance evaluation is important for me	0.7		
I could complete the e-learning tasks using the software packages if I could call someone for help if I got stuck	0.855	2.124	2.759
Its important for me to fit into the group I am with	0.673	1.793	2.329
My organization thinks I should use e-learning	0.657		
I believe e-learning can assist learning motivation	0.748	1.579	2.051
I had sufficient time and opportunities to work on the e-learning courses	0.636	1.490	1.935
Organization provides me with an appropriate job and role clarity	0.736	1.466	1.904
Contributing to a more highly-skilled workplace is	0.763	1.357	1.763
Having a long-range career goal is important for me	0.715		
Navigation between the screens in e-learning was easy	0.599	1.235	1.604
I found the e-learning materials well organized, structured and easy to use	0.536		

Factor- 1 – e learning	Factor Loadings	Eigen Value	Variance (in %)
E-learning environments are clear and understandable with instructions	0.535		
I had sufficient help and support from the course facilitator	0.712	1.213	1.576
Language used is easy to read and does not carry jargon	0.658	1.197	1.554
Using e-learning is useful as it decreases travel expenses	0.779	1.144	1.486
E-learning does helps me develop my own learning goals	0.549	1.122	1.458
Full time e-learning is not advisable as it lacks face to face interaction with trainer	0.734	1.039	1.349
I prefer face to face training along with e-learning	0.691	1.020	1.324

As can be observed the very first factor was almost accounting to 20.3% of total variance, thus showing that ***e-learning has contributed to improvement in the job performance***. Next factor was ***the content (8 %) of e learning***, ***followed by the learning experience (3.0 %)*** Thus about 30 % of the variance was explained by 3 factors. Technically, factor analysis was leading nowhere and hence was not considered to regroup observed variables into new variables to summarize commonality of all the variables.

Summary

This chapter presented summary of results and a detailed analysis of the data. The next chapter would begin with a brief review of the research issue, research methods used in the study and data analysis, based on which the conclusions are presented. Theoretical and practical implications of the results of the study would also be described. Finally limitations, strengths and suggestions for future research are presented.

CHAPTER VI

CONCLUSION & RECOMMENDATIONS

Chapter 6

Conclusion and Recommendations

This chapter reviews the purpose and significance of the study while summarizing the objective wise results of the study in the form of conclusions. Theoretical and practical implications are discussed. Finally limitations and scope for future research work in the area of e-learning are discussed.

6.1 The Study

As discussed in chapters one and two, e-learning has been researched extensively over the last two decades. Several studies were conducted to investigate a particular tool of e-learning like a blackboard systems, LMS, moodle etc as mentioned by Shu-Sheng Liaw (2007). Some studies focused on trainee's characteristics and devoted much less attention to organizational influences. More recently, a number of refined models emerged, based mostly on the previously built models [Alvarez, et al., 2004; Kraiger, 2002; and Noe and Colquitt, 2002]. Though these models provide invaluable insight on ICT training, they do not consider IT-related characteristics such as IT acceptance and usefulness.

Use of ICT in education has been extensively studied by many researchers in terms of factors that influence the likelihood of implementation success for innovative technologies in an educational setting (e.g., Brett & Nagra, 2005; Cheung & Huang, 2005; Collis, Oscar, & Pals, 2001; Dewiyanti, Brand-Gruwel, Jochems, &Broers, 2007; Goodyear, Jones, Asensio, Hodgson, & Steeples, 2005; Granger et al., 2002; Ma, Anderssonw, &Streithw, 2005; Masiello, Ramberg, & Lonka, 2005; Selim, 2003). Studies on e-learning in a corporate set-up are very limited internationally and more so in the Indian context.

It is essential first to identify the factors that influence IT training and, second, to explore how these factors can result into better training outcomes. The study aims at identifying factors which

influence e-learning adoption in Indian IT sector and also explores the factors contributing to e-learning effectiveness. Initial research work is done at an organizational level trying to understand the extent of e-learning penetration in Indian industry. 83 organizations have responded and details related to e-learning training that they offer were studied. E-learning stage that the organizations were into was also analyzed. Later the study focused on IT industry at an individual level, exploring the factors influencing e-learning adoption and its effectiveness.

6.2 The Method

At the organizational level, 83 organizations belonging to various industry sectors were studied to understand their e-learning training intervention. The industry sectors that responded across India belong to IT, BFSI, Pharmaceutical, Academia, Energy, Infrastructure and Realty and others (which include Food, textile, automotive, transport services, retail and consultancy firms). Organizational demographics related to e-learning were studied in addition to e-learning maturity level that they belong to, purpose of e-learning introduction and benefits they obtained.

In the study done at *an end user level*, 389 IT professionals across six major IT industry hubs of India have responded. Their demographic profile, opinions on factors influencing e-learning adoption and factors contributing to e-learning effectiveness were studied. Correlation amongst e-learning interactivity factors, effectiveness factors and motivational factors was analyzed. Association of e-learning factors with demographics was analyzed. Finally relationship between the influencing factors of e-learning adoption and contributing factors of e-learning effectiveness was analyzed.

6.3 Conclusions

The objective wise conclusions of the study are presented below.

Objective 1: Analysis of year of e-learning introduction, mode, e-learning tools, kinds of training e-learning used for and delivery patterns of e-learning in organizations

Organizations have begun e-learning from the year 2000 and majority of them fall into the range 2000 – 2005. This may be attributed to the fact that post globalization demands for performance at the individual level and competition at the organization level, forced organizations to adopt strategies that would give them an advantage over their competitors. Training was one such

alternative where organizations could strengthen their human capital to execute effectively and increase productivity. In this process, organizations have made a shift from the traditional mode of training to e-learning to keep pace with changes. Organizations could not afford to invest in training the numbers that were involved and hence looked at alternatives to be introduced in the main stream. E learning was found to be one such alternative which had the advantage of cost reduction, higher content retention, flexibility, ease of customization, effective monitoring and tracking systems. In the study a surge was evident again from 2011 onwards which reflects robust technological advancements in knowledge economy. This indicates the initial time period that the early adopters have embraced e-learning for the immense advantages that accrued through e-learning. The findings are in line with industry study of Bersin and Associates in online corporate training, 2005. Early majority have adapted it by 2005 and followed by late majority and late adopters (Josh Bersin, 2005).

The study showed that the *mode of e-learning* is both self paced and blended with almost an equal variation for all the sectors. As the options for e-learning tools expand, companies slowly came to realize that online learning cannot be implemented for everything and everyone. They have come to realize that, e-learning does not replace the need for instructor-led training, coaching, expert support and collaborative experiences. An equal spilt in self paced and blended mode only indicates this transition of companies. According to the research conducted by Bersin and Associates at industry level research revealed that blended learning is a main stream approach for stage 2 companies and further. The study too found out that there is an equal split between 1st stage and 2nd stage companies and hence the same split gets reflected in self paced and blended learning mode adoption as well.

E-learning delivery pattern is mostly online instructional material, Collaborative learning does almost not exist in a corporate set up where as virtual classroom and webinars have their presence only in IT sector. Virtual classrooms enable training for geographically distributed workforce and webinars as a platform to reach much targeted audience live or on demand. Both require an infrastructure base for their launch and implementation. IT industry with the requisite infrastructure can easily adopt delivery patterns like virtual classrooms and webinars while the other sectors would find it difficult to embrace such delivery patterns of e-learning. The study too reveals the same trend.

Organizational level analysis revealed that E-learning is used for different types of training. In the study it is shown its implementation for technical, domain and soft skills predominantly. Compliance training was rated high in IT sector. This training is majorly a set of rules and regulations that are briefed to update the employees on the organizational processes, e-learning deployment for this training seems quite justified as deploying a training resource for a redundant practice as this could be time and cost consuming. E-learning deployment in sales training in banking sector is also seen. The study also identified the use of e-learning for quality management and business process training across sectors. This gives an idea of e-learning penetration and its deployment for various types of training. There are a plethora of E-learning tools available currently and the study indicates that JIT, Live webcasting, Audio video conferences, LMS are used mostly in IT sector, and that Virtual learning environment, electronic simulations, pod-casting and M-learning are a rarity across the sectors. This could be a good input to e-learning companies developing content to guide them through opportunities and usage across sectors. The study also shows the potential of e learning in the IT sector in so far as the Video, audio conferences, live webcasting and M-learning are concerned which are being implemented. M-learning enables accessing media files, audio, or video when convenient, or accessing information from documents or Web pages, when and where desired has beneficial immediate benefit to the learner. These advantages can be availed by other industry sectors too. Video and audio conferences can simulate classroom environment, incorporate a variety of media, ensure constant delivery of content, providing immediate feedback and eliminating travel cost. Web conferencing systems allow participants to communicate in real time with simply a personal computer and an internet connection and provide an environment of face to face communication through geographically located at different places. Robust information access can aid workforce with ready help on the job and reduced cost can help organizations to maintain their training budgets.

Objective 2: Observe the purpose of introducing e-learning and benefits obtained

It is evident from the mean scores obtained from the data analysis that primary objective to introduce e-learning into their organizations was to make training accessible to employees in remote locations (mean 3.70). Secondly it is to provide ease of access at the workplace (mean 3.55), and further to reduce per employee training costs (3.53). According to the organizational analysis done in the study, the organizations were able to derive benefits such as training dispersed

employees in remote locations (mean 3.60), increase ease of access to training at workplace (mean 3.42) and in the process were able to build consistency and reliability in training. These findings correlate with the organizations' intentions to introduce e-learning.

Further, it is found that there is no association observed between purpose of e-learning introduction and the mode of e-learning chosen by organizations and hence the transition in mode can only be attributed to the organizations' e-learning maturity level as indicated by Bersin and Associates (2005). Same is showed in the study too that there is no association observed between mode of e-learning employed and benefits anticipated from e-learning by organizations because the transition happens only according to the e-learning maturity stage of an organization.

Objective 3: E-learning maturity level of organizations and their dependence on sectors

The study gives an idea about the maturity level of organizations across different sectors. The Study shows that majority of the companies in sectors other than IT, Banking and Pharmaceutical industry are in stage1, where as there are no companies which are into stage 4 except for very few in IT segment. In stage 2, there are IT companies and a few in the Banking sector as well. In stage 3, there are IT companies and very few in the other segments. Except for IT sector which has its presence in all the 4 maturity levels the other sectors are yet to transcend to reach good e-learning maturity levels. This analysis reveals that an understanding of organizations' fit into different stages of maturity would aid them to plan next steps in becoming more successful. Further the study also identified that there exists a relationship between industry sector and its e-learning maturity level. This clearly points out the variation amongst companies' maturity levels across industry sectors. E-learning Maturity levels ranging from 1 to 4 are evident in IT sector as the industry has the advantage of existence of infrastructure required for e-learning and tech savvy workforce, while the other sectors would require infrastructure establishment and training related to e-learning. India is evolving as a hub of e-learning content with high numbers of technology and multimedia professionals. Industry sectors can take advantage of this indigenous development and adopt e-learning to gain an edge in the training domain.

Objective 4: Demographic profile of IT professionals and their role on factors influencing e-learning adoption and effectiveness

According to the Study, most of the learners were between the age group 20 to 30 yrs and 30 to 40 yrs. Majority of them carried experience between 5 to 10 years while the rest are spread between 1 to 5 years and above 10 years. Amongst the entire set of respondents, 79% were male respondents and 21% were female respondents. Medium of education was predominantly English (94%) while very few (6%) hail from vernacular background. Study showed that 36% of respondents were degree holders, 63% with Masters and just 1% of them with PhD. English as a medium of education amongst IT employees is a common factor while the statistics show that the industry is now recruiting professionals with masters too to strengthen their knowledge base and performance. Analysis of their management level indicated that 41% were into middle level management and 46% into operational level while 13% of respondents from senior management. 79% of respondents had prior exposure to e-learning and 21% did not have a prior exposure. *Compliance training* stood out as a type of training that e-learning is extensively used for, which is in correlation with findings of organizational level analysis. Types of training e-learning used for in IT sector also included technical skills training, domain skills training and soft skills training, while quality management had sparse inputs on e-learning implementation. Compliance training is all about the regulations to be followed in an organization for certain processes and deploying e-learning for compliance training can yield better productivity while saving working hours and redundant training sessions. Quality management in IT industry happens through debugging procedures and hence using e-learning for quality management is used on a lesser scale.

According to the study IT industry professionals are confident in operating e-learning functions with built-in help (mean 3.14), they also responded that they feel confident operating e-learning functions even if there was no one around them to tell what to do as they go (mean 3.27). The results are not so much in congruence with the proposition that e-learning projects were not successful in achieving their goals as they did not have access to technical advice and support (Aldexander, Mckemzie, & Geissinger, 1998, Soong et al., 2001. But it can be explained taking the audience/ end users into consideration. The learners were tech savvy and worked with computers as part of their profession and hence perhaps are slightly at a higher level of self efficacy. The study also had inputs towards ease of use by IT professionals as they mentioned that e-learning

materials were well organized, structured and easy to use. This corresponds to Venkatesh (2000) and Agarwal and Prasad (1997) who reported that users self efficacy could influence use of technology and also Taylor, Todd (1995) and Selim (2005), who said self efficacy is a measure of users' confidence in their ability to use technology for learning.

According to Rossett and Schafer, 2003 low levels of learner motivation can result through confusing instructions for learning tasks and difficulty in navigating through courses. In the study too, employees of IT industry mentioned that navigation between screens in e-learning was easy and similarly also exhibited high learner motivation saying that they prefer material that challenges them so that they can learn new things (3.30)

Well-designed course content provided students with better learning experiences (Gan, 1998; Parker,1997) and helped students to access information easily (Carlson & Zhao, 2004).Selim (2005) stated that the effectiveness and efficiency in delivering the e-learning based components of a course is one of the most critical factors to students' acceptance of e-learning and success in e-learning courses. Though these were researches conducted in a student context, they are equally applicable in a professional context as IT professionals still feel that an opportunity to practice ahead will increase user-friendliness (3.29). They opine that use of examples (mean 3.41) and interactivity in e-learning modules can promote learning (mean 3.37). These results are in agreement with Beningo and Trentin (2000) who suggested that interaction with peers and supports available via online discussions are related to acceptance of e-learning and their performances. The respondents also mentioned that provision of assessment features like pre-tests, post-tests as part of content can improve learning which correlates with findings of Driscoll, 2002 who pointed out that meaningful feedback improves performance. The results also reassert the proposition put forth by e-learning evaluation report- JISC (2005), a study conducted across UK, in different regions and among different sectors.

Ahmed Gad abdel- Wahab, 2008 in his study mentioned that attitude towards e-learning is an important factor. As also suggested by Woodrow (1991), it is important to be aware of learners' attitude and behaviors towards e-learning as it is a critical criterion for e-learning readiness. The study showed that IT professionals opine that their organization values self development and progressive innovation (mean 3.14) and they have a complete role clarity (mean 3.04).In an effort

to measure their attitude towards adopting e-learning and learning, the study reveals IT professionals' learning motivation. Ownership of learning is the key factor for the pedagogical construct that e-learning follows and hence self motivation is an essential to facilitate learning and development of professionals. Similarly complete role clarity would enable them to focus on knowledge acquisition for their career growth and advancement.

According to Poon et al., 2004, Rafaeli & Sudweeks, 1997 the interfaces of e-learning courses and institutional information technology infrastructure should be user friendly, reliable and secure and the study confirms the aspects. IT professionals admitted that they found the e-learning materials well organized, structured and easy to use (3.12 mean). It is important that the interface of e-learning to be structured and organized in a way that enables transition from one module to another. Threaded communication could lead to confusion in the learners leading to losing focus and reduced retention of knowledge. Hence interface acquires importance in the context of e-learning.

The study revealed that using e-learning is valuable as it decreases travel expenses and provides ease of access (with a mean of 3.11) and believe e-learning makes training accessible to employees at remote locations (3.36) concur with Papp (2000), where he mentions users like to use e-learning if it facilitates their learning and allows them to learn any where any time in their way.

It is observed in the study that the IT professionals feel that learning is always a good chance to improve task ability(mean 3.35) and would want challenging material to learn new things (mean 3.30) Having a long range career goal is important (mean 3.22). Contributing to a more highly-skilled workplace is important (3.14).They consider e-learning as time and effort well spent. The results coincide with observations of Davis and Wiedenbeck 2001 who propose that intrinsic motivation as key determinant for adoption and sustainability. They are also in alignment with success factors identified by Borotis, Zaharias, Poulymenakou (2008), motivation to learn, and alignment with business objectives as mentioned by them. Observation from the study, e-learning helped them acquire intended knowledge, skills and attitudes required for job (mean 3.20) is in line with Rosenberg 2005 findings that learning has to be in alignment with business objective.

The Study aimed at analyzing subjective norms that IT professionals get influenced. Learners of IT industry revealed that their organization thinks they should use e-learning (mean 3.09), asserts the role of subjective norms on user as pointed out by DiMaggio and Powell, 1983, Van Den Bulte and Lilien 2001.Results of the study where users mentioned that they believe e-learning is a useful learning tool (3.42) and that e-learning environments are clear and understandable with instructions(3.19) concur with importance attributed to perceived ease of use and usefulness in e-learning adoption and implementation by Venkatesh and Davis 2000.

The study indicates that IT professionals give their 100% effort to learn as much as possible (mean 3.04). They strongly believed that e-learning makes training accessible to employees (mean 3.36).High mean scores on these items of questionnaire concurs with Selim (2005) and Volery and Lord (2000) who also stated that learners behaviors and attitudes toward e-learning are critical factor for advanced e-learning. Ethos of learning behavior includes relationship with self, relationship with others and relationship with curriculum offered. The study also reasserted learner's behavior in all dimensions, IT professionals revealed the influence of subjective norms, their self efficacy which is high and also responded stating a good relevance of e-learning.

According to the correlation results in the study, content quality is highly correlated with ease of use (r= .620), which is also in consensus with proposition that a well designed course content provided learners with better learning experiences (Gan, 1998; Parker, 1997) and helped students to access information easily (Carlson & Zhao, 2004). It is also observed in the study that there is a positive and strong correlation between e-learning transfer and e-learning effectiveness which is also in consensus with the statement that e-learning achievement influences e-learning transfer positively put forth by Rabeb Mbarek (2013) while examining factors affecting e-learning effectiveness. He also mentioned that Perceived ease of use by learners influences positively e-learning achievement which is observed in the study too. His work also propounded that computer self efficacy influences ease of use and the study reflects the same observations. The correlation observed between self efficacy and perceived ease of use is also put forth by Muneer Mahmood Abbad (2009) in his study. One's ability to work in e-learning domain forms the basis to embrace the practice, which is learner's self efficacy, in the same vein, ease of using e-learning domain also determines the adoption proportion. Once the learner finds the e-learning tool easy to use, learner would develop the confidence to use e-learning, which is also reflected in the study.

The correlation results of the study also point out that e-learning achievement and e-learning transfer are positively and strongly correlated (r=.618) which is also put forth by Lim et al (2007) on validating e-learning factors affecting training effectiveness in terms of learning. Hence the study also reinforces the findings of Jaflah Al-Ammari Et Al (2009) who put forth that Computer self-efficacy will positively affect learners' perceptions of ease, and that content quality will positively affect learners' perceptions of ease of using e-learning system. Findings also match Chiu et al [2005] and Lee [2006] research conclusions that computer self efficacy had a positive and direct effect on perceived ease of use (r = 0.330).

It is observed in the study that Academic qualification of IT professionals has a relationship with perceived self efficacy, pre-training attitude and internet experience. This aspect has not been analyzed in an Indian context so far, it would be useful to training managers to understand the details. The study results show that education level has a relationship with factors influencing e-learning adoption. It concurs with Md. Aminul Islam etal(2011) in their study in Malaysia that points out presence of significant relationship between level of education and the effectiveness of e-learning. Level of education of the learner also determines the confidence to use new training interventions for learning, As the horizons of knowledge of an individual expand, there is also a realization that they need to acquire new skills relevant to job and hence a relation between level of education and their self efficacy and pre-training attitude is observed in the study too.

Analyzing the variance of factors in relation to number of online courses taken by the end user, it indicated that number of online courses taken by the user has a relationship with internet experience and has no association with other factors influencing e-learning adoption or e-learning effectiveness. Data analysis also showed that prior exposure to e-learning does not have an impact on any of the factors, e-learning adoption or e-learning effectiveness, all the hypotheses stand rejected. Analysis of the two variables related to learner's experience: Number of online courses user has taken earlier and users' prior exposure to e-learning, coincide in their findings. This goes to say that there is no experience in e-learning required to embrace it as a training intervention. Volery and Lord (2000) –in an Australian study have identified 3 critical successful factors of which, previous use of technology was considered to be an important factor and prior knowledge of e-learning at an operational and conceptual level is important according to Luckin et al., 2003 in

his survey in UK and also supported by Graham Attwell and Jenny Hughes (2004). The study differs with these propositions that prior exposure to e-learning has a relationship with e-learning effectiveness. This can perhaps be explained by the industry sector respondents belong to, in the study, the learners are from the IT industry and hence need no exposure to adopt embrace e-learning.

Age of IT professionals in the study is observed to have an association with perceived e-learning effectiveness, e-learning transfer, perceived self efficacy, and perception of learning culture, computer anxiety, subjective norms and perceived usefulness. Age of IT professionals also has an association with perceived e-learning effectiveness, e-learning transfer. The results are in consensus with observations put forth by Md. Aminul Islam etal.,(2011) in their study in Malaysia conducted with respondents of different age, gender and different level of education. Penina Mungania (2003) too in his research report ascertained that age has an influence in e-learning. It is observed from the study that Level of management has an association with pre-training attitude of IT professionals which correlates with Penina Mungania (2003) research report results. Age could play a crucial role in determining learners' perception of self efficacy, learning culture, usefulness, subjective norms which are the factors influencing e-learning adoption. Age determines the exposure of an individual and thence the amount of knowledge and awareness he acquires in his professional career. E-learning transfer and its effectiveness are in turn dependent on the factors influencing e-learning adoption and hence the relationship is seen in the study. It is also the level of management of the learner that defines professional comprehensiveness and competency of an individual and hence it has its influence on the pre-training attitude of the learner.

It is also observed in the study that *gender has an association with learning motivation* of an IT professional and no other factors related to e-learning adoption and its effectiveness. Previous studies on e-learning by Tzong Jan et al., 2012 and Cheng et al., 2011 analyzed variance across TAM constructs and found that gender, prior experience had no significant influence on attitude and intention to use e-learning. Though Ong and Lai (2006) found that men's perceptions of usefulness were more significant and salient in adopting e-learning, but the study differs with this finding and states that gender has no influence on respondents' perception of usefulness of e-learning. Gender in the previous studies had its influence on factors related to e-learning, in the IT sector, competency and vigor of workforce is independent of its gender as they hail from similar

educational background and work experience. Competitive human resources in knowledge economy function alike and embrace technology with equal potential, therefore the study shows that they have no influence on factors influencing e-learning.

Objective 5: Relationship between the factors affecting e-learning adoption and factors contributing to e-learning effectiveness

Regression analysis conducted is identical with analysis reported by Ndubisi (2004) in his study on e-learning adoption intention. It is observed in the study that achievement and satisfaction has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, perceived usefulness and computer anxiety. Learning culture, perceived usefulness and learning motivation have a significant impact**.** The results are in congruence with Pei-Chen Sun etal., 2006 findings that **le**arner perceived usefulness of the e-Learning system and perceived ease of use have a positively significant influence on perceived e-Learner satisfaction. The study's results also coincide with Rabeb Mbarek (2013) who presented in his study that perceived usefulness and ease of use has an impact on E-learning achievement. The study also reasserts that relationship between computer anxiety and e-learning achievement and satisfaction is significant according to Ndubisi (2004).

Three contributing factors to e-learning effectiveness stand out to be e-learning achievement, perceived e-learning effectiveness and e-learning transfer. Self efficacy of the learner, ease of use of the system, content quality of the e-learning which constitute the dimensions of e-learning interactivity have relationship with Achievement and satisfaction of the end user. Unless one perceives the system to be of good quality and easy to use and gains confidence to use, one would not implement and accept e-learning, which is witnessed. Similarly the way end user perceives learning culture of the organization, encouraging aspects and training policies prove their significance. The motivation learner carries to learn and upgrade his skill set also determines learner's achievement and satisfaction through e-learning. Learner's anxiety towards computers would hinder their initiative to embrace e-learning as they need to master technology in order to gain comfort in acquiring knowledge. Similarly perceived usefulness and subjective norms also determine user's satisfaction levels in e-learning.

Regression analysis in the study pointed out that e-learning effectiveness has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, perceived usefulness and computer anxiety. Learning culture, subjective norms, usefulness, computer anxiety have a significant impact on e-learning effectiveness. The results are in congruence with Shu- Sheng Liaw(2007) findings that Perceived usefulness and Content quality have a positive relationship with e-learning effectiveness. Lim et al (2007) also reported that learning motivation, Content quality and learning culture have a positive significant impact on training effectiveness and Albert Leung (2006) in his study reported higher learning motivation, higher learning effectiveness. Similarly in their research on employees' e-learning performance Wen-Chieh Wu et al., 2009 mentioned that learning culture has an impact on e-learning effectiveness. Wen-chieh Wu and Lan-Yin Hwang (2010) also found that perceived usefulness and e-learning effectiveness are positively related. Regression analysis done with e-learning effectiveness and other influencing factors are in consensus with all the above findings. Influencing e-learning adoption factors identified in the study have a significant impact on perceived e-learning effectiveness of the user. Factors like content quality, self efficacy and ease of use constituting the interactivity dimension will determine the effectiveness of the system as these are the attributes that define the interactivity level of the user. Learning culture of the organization define the participation of the user in training. Learning motivation defines the initiative and interest of the learner to acquire skills through training. Subjective norms will have their influence in determining how the user perceives using the system as opined by others and hence has its role in influencing e-learning effectiveness. Fundamentally, unless the user finds the course or e-learning offered useful, it is not effective and hence usefulness determines the level of effectiveness too.

The study which aimed at analyzing the 3rd factor of e-learning effectiveness, e-learning transfer indicated that e-learning transfer has a positive relationship with E-learning Interactivity, learning culture, learning motivation, subjective norms, usefulness and computer anxiety. Learning culture, learning motivation, subjective norms and usefulness have a significant impact on this factor. The results coincide with findings of Allison Hodges, 2009 in his study on e-learning and effectiveness reported that there is a positive relationship between e-learning transfer and effectiveness. Unless

the learning gets transferred to the job, the training is not effective and hence even in the Indian IT industry context, e-learning adoption factors play an important role in determining learner's intention to use e-learning and finally its effectiveness.

Utility dimension with usefulness, interactivity dimension with ease of use, content quality, self efficacy, social influence with subjective norms, organizational dimension with learning culture, motivation dimension with learning motivation, and subjective dimension with computer anxiety have their influence on e-learning adoption and lead to e-learning effectiveness.

The study thus, provided a complete framework to understand e-learning training intervention end to end, from its adoption to its effectiveness. Understanding the factors that influence e-learning adoption can enable training practitioners to deliver effective training programs that motivate trainees, promote training transfer, improve individual performance and ultimately improve organizational performance. Certain findings like the age and its association with e-learning factors can be taken into consideration while planning training. Similarly the level of management and its association with pre-training attitude can be kept in mind while formulating training plans. More importantly the study provided a broad spectrum of factors which influence e-learning adoption and effectiveness. Factors from all dimensions have been included in analysis and the framework can be applied to any industry sector to study e-learning adoption.

6.4 Suggestions

(a) E-learning tools like Just in time modules, webinars (which are interactive) can enhance performance of professionals, which is shown in case of IT industry and can be adopted by other industry sectors too.

(b) Collaborative learning could enhance knowledge sharing and hence the sectors can embrace this delivery mechanism to improve dissemination of information and knowledge in an organization.

(c) Banking, Pharmaceutical industry verticals can use e-learning for compliance training like IT sector as seen in the research study.

(d) M-learning is gaining momentum as we get to see that all applications are being customized to a mobile platform, India being a land of largest digital natives, can embrace m-learning across the sectors.

(e) At an individual level, despite the fact that the IT professionals are motivated learners, it can be a good practice to set the goals and timelines for the e-learning they do before they get started. Structured group discussion after e-learning course, giving it a blended learning flavor can get them inclined towards adopting e-learning readily as opined by training practitioners in IT industry in an interview with them.

(f) Help from the facilitator with a pre-training briefing could help them improve their learning as opined by end users in the study.

(g) A clear understanding about how e-learning relates to the company goals can help them embrace it readily. Sufficient time to work on courses can motivate them to take to e-learning as mentioned by end users in study.

6.5 Recommendation for further research

(a) The study has focused on the understanding of e-learning adoption and effectiveness of IT industry which showed an e-learning maturity level at a relatively advanced stage compared to other sectors that have responded. Future researchers can aim at investigating e-learning practices across different industries in India and can examine how training practitioners can come up with an effective learning strategy. Majority of the results indicate that the end users are tech savvy and hence find it comparatively easier to adapt e-learning. It would be interesting to see how the observations vary with change in the industry sector with not so tech savvy workforce.

(b) The study can be extended to measure business results of organization as part of training evaluation and ROI (Return on investment the extended level of training evaluation) on e-

learning effectiveness. Analysis of e-learning effectiveness was limited to understanding user's opinion of effectiveness. It can be extended to the fourth level of Kirkpatrick's training evaluation measuring the business results.

(c) It is recommended that training managers of organizations conduct research in their own interest to understand implications of e-learning training interventions and its success in terms of its contribution to business results. Analysis at the fourth level can be done only at a chief learning officer or a training manager level who have an access to all relevant data of the learner. This would include the pre and post assessments on LMS, completion rates, their performance appraisal reports to check progress along specified learning path, their skill performance in terms of their certifications acquired etc. Research work done with an access to details like measure of their job performance in terms of projects completed, reduction in project cycle time can give a complete measure of effectiveness. In order to conduct research at fourth level of Kirkpatrick, one needs to have an access to business performance indicators such as cost savings (e.g., reduced travel expenses, reduced administrative costs) quality improvements (e.g., improved satisfaction, reduced cycle time, help-calls reduction), and improved client reviews (e.g., increased orders, reorders). Further research can be conducted using these indicators of learning effectiveness.

(d) Aspects like preference to blended learning over self paced learning from the end user's perspective and immediate manager's motivation to complete their assigned e-learning courses also can be studied at a closer angle. Though the study has included organization learning culture, these are factors which might influence e-learning effectiveness as mentioned by a few industry practitioners.

(e) Further research can focus on longitudinal studies in individual or team wise e-learning and examine influencing factors on e-learning effectiveness. Similar studies can be conducted in Banking and finance sector and pharmaceutical industry which seem to embracing e-learning practices at a growing pace.

6.6 Relevance and utility of the study

The study contributed both in terms of theory and practice in the IT context in a developing country like India. The study has contributed to theory through an integration of multiple concepts from multiple dimensions with contextual variables and constructs drawn from them. The conceptual framework is derived from literature, from studies conducted in isolation. Constructs related to technology acceptance and adoption has been integrated to provide a comprehensive investigation from all related dimensions.

The study also contributed to provide an understanding of e-learning maturity level of Indian organizations. The research work also provides an insight into organizations' perspective of e-learning benefits and purpose of its inclusion alongside the predominant delivery patterns, tools and mode of e-learning used in their organizations. The literature review was done from various dimensions and various concepts; this can provide a platform to researchers to arrive at patterns for further research. Further the study also focused on factors contributing to e-learning effectiveness, thus providing further scope for research.

This study provides insights into IT industry e-learning pattern, their attitude which would enable training practitioners to deliver effective training programs that motivate trainees, promote their learning transfer to job, and improve their productivity.

An overview of the e-learning training intervention would be helpful for the e-learning training industry to understand the requirements of their clients. The focus on e-learning maturity level can bring awareness to industry and might enable them to upgrade their maturity level. Analysis of purposes and benefits of industry sectors to introduce e-learning can help e-learning providers to comprehend the requirements of industry.

"The need for better and more widely used evaluation models is critical to the future of e-learning" said Moller et al., 2008. Organizations always are in quest of training courses of high quality and value so that their employees would be able to transfer their learning to their job. Uniform measurements constructed to track the connections between e-learning, employee performance, and profitability would be beneficial to both organizations and employees. This study will contribute to future e-learning systems developers and training managers with the help of a comprehensive e-learning evaluation model.

6.7 Limitations of the study

The main limitation of this study is the sample size at an organizational level. As described in chapter 4 the responses were sought from training manager or a head HR level and hence had a limited access, this could have played a role in reducing the potential number of respondents from organizations.

Lack of support for research/ research culture among employees and the closed nature of the organizations in the name of competition limit the research efforts and hence the rigor required in research to make statements with conviction. Besides these academic reasons, the researcher as a full time faculty had to encounter problems for data collection and hence the researcher's convenience was also kept in view for purposes of sample and data collection. As the questionnaire was conducted online and sent to IT employees, they were not able to access the online questionnaire during the work hours because of the firewall on intranet and hence had to source their personal email ids to reach out to them after working hours with intermittent gentle reminders.

Findings of this study are from the perspective of understanding IT employees' e-learning practices in an Indian context and hence cannot be generalized for the other groups of people. . The individual IT professionals' perceptions and observations have been extended to IT organizations and have been assumed as honest responses.

This study is confined to Indian context only; similar studies conducted in other geographical areas with larger samples can further reinforce and support the observations.

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ANNEXURES

Appendix A Questionnaire

eLearning in India- Effectiveness and Best practices

This survey is being conducted on eLearning and its adoption by Corporates in India as part of the research work taken up by a research scholar, Ms. N. Padmaja from the University of Hyderabad (Central University) in collaboration with 24x7 Learning, India's Premier eLearning implementation company.

The objective of this survey is to analyze the efficacy of e-learning training intervention, its penetration across various sectors in India and its adoption pattern. The survey shall attempt to map effectiveness indicators from the main stakeholders to the existing practices. Your valuable inputs can help us define the critical success factors for effective e-learning and enable us to suggest best practices to meet the changing demands of industry.

If you know of other organizations who can potentially share their inputs please forward this link to them.

1. Name of the organization _____

2. Year of e-learning introduction: 190-1995/1996-2000/ 2001-2005/ 2006-2010/ 2010 and above

3. Currently e-learning is being offered to: Entry level individual contributors/ First time Managers /Middle level management /Senior level management

4. Mode of e-learning offered in our organization: Self Paced/ Blended learning (Instructor led training with e-learning)

5. **E-learning delivery pattern** that is followed in our organization.

S.No	Item	Never	Rarely	Frequently	Mostly
1	Online instructional material				
2	Offline instructional material (Downloaded files, CD-ROM content etc)				
3	Collaborative learning using wiki/blog/discussion forum				
4	Virtual classrooms				
5	Webinars				

6. The purpose of introducing e-learning was to

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	To reduce per employee training costs				
2	Make training accessible to employees in remote locations				
3	Build consistency and reliability in training				
4	Ease of access at the workplace				
5	Decrease time to market new product or strategies				
6	Increase learning effectiveness and information retention				

7. **Benefits of e-learning** achieved in your organization

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	Reduce per employee training cost				
2	Train dispersed employees in remote locations				
3	Built consistency and reliability in training				
4	increased ease of access at the workplace				
5	Trained channel partners				
6	Increased the speed of go-to-market roll out				

8. **Kind of training**- Rank the frequency of using the e-learning with regard to the type of training offered

S.No	Item	Never	Rarely	Frequently	Mostly
1	Technical training				
2	Domain training				
3	Sales training				
4	Compliance training				
5	Soft skills training				
6	Quality management training				
7	Business process training				

9. **E-learning tools** that are used in the organization

S.No	Item	Never	Rarely	Frequently	Mostly
1	Interactive e-lessons (appended with audio and video)				
2	Electronic simulations				
3	Job aids with just in time lessons				
4	Chat and IM				
5	Video and audio conferences				
6	Live webcasting				
7	White board				
8	Virtual learning environment				
9	Podcasting				
10	E-assessment using LMS				
11	M-learning				

10. **E-learning stage** that the organization is into (Choose one option)

S.No	Item
1	Early stages of getting the funding, choosing the right infrastructure and internal culture change to adapt to e-learning. Looking at expanding e-learning into a larger LMS, do not have content library, dealing with e-learning adoption issues
2	Rolled out many off the shelf courses, have some type of LMS, started experimenting with blended approaches, e-learning is now a fixed cost of our organization
3	E-learning is now integrated with existing technologies and business processes, started measuring e-learning effectiveness and no longer e-learning adoption
4	We have LCMS, EPSS, FAQ database, online references, higher adoption of webcasting and rapid e-learning and basically run on the concept of learning on demand

Thank you for your time.

Appendix B Questionnaire

Factors influencing e-learning in Indian IT Industry

This survey is being conducted on e Learning effectiveness and its adoption by Corporates in India as part of the research work taken up by a research scholar, Ms. N. Padmaja from the University of Hyderabad (Central University) .

The objective of this survey is to analyze the efficacy of e-learning training intervention, its penetration across the industry in India and its adoption pattern. The survey shall attempt to map effectiveness indicators from the main stakeholders to the existing practices. Your valuable inputs can help us define the critical success factors for effective e-learning and enable us to suggest best practices to meet the changing demands of industry.

1. Name of the organization _____
2. Total number of years of work experience _____Years
3. Industry _____
4. Age _____Years
5. Gender Male/Female
6. Medium of education English/ Vernacular
7. Highest Qualification: Bachelor's degree/diploma, Master, Doctorate
8. Current Management level Operational/middle/senior
9. Job Title _____
10. Prior exposure to e-learning in earlier organizations or during education: Yes/ No
11. Location Mumbai or Pune/Hyderabad/Kolkatta/Delhi or Gurgaon / Bangalore/Chennai

12. E-learning in our organization is used for:

S.No	Item	Never	Rarely	Frequently	Mostly
1	Technical training				
2	Domain training				
3	Sales training				
4	Compliance training				
5	Soft skills training				
6	Quality management training				
7	Business process training				

13. Number of online courses taken so far: 1-5/ 6-10/ 11-15/ 16-20/ 21-25/ 26-30/ over 30

14. Do you have access to a computer whenever you need it at the workplace:
Yes/ No

15. Are the e-learning courses offered mainly in the work time:
Yes/ No

16. A list of 8 statements is given below which elicit self assessment of **self efficacy** in relation to e-learning. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I feel confident operating e-learning functions even if there was no one around to tell me what to do as I go				
2	I feel confident using e-learning contents if I had built in help facility for assistance				
3	I feel confident operating e-learning functions if someone showed me how to do it first				
4	I could complete the e-learning tasks using the software packages if I could call someone for help if I got stuck				
5	I could complete the e-learning tasks using the software packages if I had used similar package				

	like this one before doing the task				

17. A list of 6 statements is given below which elicit self assessment of **usefulness** as perceived by you in relation to e-learning. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I believe e-learning is a useful learning tool				
3	I believe e-learning contents are of right level and depth				
4	The e-learning courses covered things I wanted to learn				
5	E-learning courses enhanced my productivity at work place				
6	Using e-learning platform ameliorate the course understandable				

18. A list of 5 statements is given below which speak about self assessment of **ease of use** as perceived by you in relation to e-learning. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I found the e-learning materials well organized, structured and easy to use				
2	Navigation between the screens in e-learning was easy				
3	E-learning environments are clear and understandable that helped me learn				
4	I prefer face to face training along with e-learning				
5	It would be easy to become skillful at using e-learning platform.				
6	Opportunity to practice or experiment can enhance user friendliness				

19. A list of 5 statements is given below which elicit self assessment of **content quality of e-learning** as perceived by you

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	Language used is easy to read and does not carry jargon				
2	Provision of assessment features like pre-tests, post-tests can improve learning				
3	Use of examples in e-learning can help me understand better				
4	Interactivity in e-learning promotes learning				
5	Logical arrangement and presenting in understandable chunks would enhance learning				

20. A list of 6 statements is given below which speak about self assessment of your **learning motivation**. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I have control over my learning process				
2	I prefer material that challenges me so that I can learn new things				
3	The most satisfying thing for me is trying to understand the content as thoroughly as possible				
4	I think learning is always a good chance to improve my task ability				
5	I give 100% effort to learn as much possible during the training given in the organization				
6	I am a person who embraces change				

21. A list of 9 statements is given below which elicit assessment of the **learning culture** in your organization. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I had sufficient help and support from the course facilitator				
2	I had sufficient time and opportunities to work on the e-learning courses				
3	Pre training briefing was delivered before the start of the course, setting the expectations clear				
4	Structured group discussion after e-learning can help increasing comprehension of the course				
5	Long term and short term plans for e-learning were set, goals, targets and timeline was discussed before we got started				
6	Organization facilitates us to work on e-learning courses while coping with pressures at work				
7	I feel organization values employee self development and progressive innovation				
8	Organization provides me with an appropriate job and a role				
9	My employer has explained how and why e-learning initiative relates to their company's corporate objectives				

22. A list of 8 statements is given below which elicit self assessment of the **achievement and satisfaction** in relation to e-learning. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	If I had an opportunity to redo my courses I would opt for e-learning				
2	I consider e-learning experience as time and effort very well spent				
3	E-learning does not help me develop my own learning goals				

4	Somehow I worked harder in online courses than I usually do.				
5	E-learning was useful in helping me develop new ways to achieve work Tasks				
6	E-learning made me more responsible for my own learning than I usually am.				
7	In always consider e-learning as a valuable and constructive learning experience				
8	Having used e-learning, I would recommend it to my colleagues to use it for study purposes				
9	Evaluation system used in e-learning gave me clarity on my learning				

23. A list of 5 statements is given below which speak about self assessment of your e-**learning transfer**. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	My work allows me time to try the new things I have learned during online courses				
2	The activities that I have learnt during online course helped me know how to apply my learning on the job				
3	I feel I am using what I learned from the training in my daily work				
4	My job performance has improved since completing that training program				
5	I give 100% effort to learn as much possible during the training given in the organization				

24. A list of 6 statements is given below that speak about self assessment of your perception of e-learning **effectiveness**. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I believe e-learning can improve one's learning efficiency				
3	I believe e-learning can assist learning motivation				
4	Full time e-learning is not advisable as it lacks face to face interaction with trainer				
5	Using e-learning is useful as it decreases travel expenses				
6	Adopting e-learning will increase trainees' satisfaction				
7	I believe e-learning can improve one's information retention and helps us achieve tasks at work				
8	E-learning helped acquire intended knowledge, skills and attitude				
9	I believe e-learning makes training accessible to employees at remote locations				

25. A list of 3 statements is given below which elicit self assessment of **subjective norms** at your workplace. Please indicate your level of disagreement or agreement with each of the statements

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	My organization thinks I should use e-learning				
2	People who are important to me think that I should use e-learning				

3	People who influence my behavior think that I should use e-learning				
4	It is important for me to fit into the group that I am with				

26. Please indicate your level of disagreement or agreement with each of the statements in the context of **training at workplace**.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	My employer providing e-learning opportunity to improve my skills is important				
2	Rewards and/or recognition from my employer for taking e-learning is important				
3	Having time available on the job for e-learning is important				
4	Having a long-range career goal is important				
5	Contributing to a more highly-skilled workplace is important				
6	E-learning participation being factored into my performance evaluation is important				
7	The concern that my employer may monitor my progress without my knowledge is important				
8	Need of training in order to do my job well is important				

27. A list of 4 statements is given below; please ignore them if you belong to Industry. These statements speak about self assessment of **computer anxiety**. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I hesitate to use computer for fear of making				

	mistakes that I cannot correct				
2	I get a sinking feeling when I think of trying to use a computer				
3	I have difficulty in understanding technical aspects of computer				
4	One has to be a genius to understand the special keys on computer terminals				

28. A list of 2 statements is given below; please ignore them if you belong to Industry. These statements speak about self assessment of your **Internet experience**. Please indicate your level of disagreement or agreement with each of the statements.

S.No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1	I spend many hours using internet				
2	Usage of internet has influenced my life in a positive way				
3	Organization can use internet effectively for training and development				
4	I often use internet to search for a specific information				

Thank you for your time.