Chapter I
Introduction

1.1 e-Learning Overview

e-Learning facilitate through the use of computers which are in the network to transfer to knowledge and skills building process, at the request of learner. The journey of e-Learning stated with computer based learning followed by web based learning and the today has given us an virtual environment of teaching and learning with e-collaboration, e-evaluation and simulation based developing skills.

e-Learning has variant forms of interrelated electronically developed components that are serviced through an interface that implement process of teaching and learning.

E-learning made up of many forms of electrically supported education. The term will still most likely be utilized to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum. Every day new enhancement are getting develop in this area [1].

e-Learning is the mechanism to convert knowledge, skills and information through computer, web-based applications and network topologies. Through e-Learning the contents are transferred via media like Internet, Intranet/Extranet, Audio, Video Tape, Satellite Television and ROM media.

Now a days e-learning is also possible through sophisticated devices like Tablet PC / Mobile Phones / Palmtop and other emerging devices. e-learning can be bested viewed as computer assisted learning [1].
1.1.1 e-learning Service Approaches

In education e-Learning was involved directly or indirectly since it evolved. There are several situations where classroom teaching and learning are involved with practical and classroom teaching.

There can be many approaches of the e-learning where Internet is involved or Internet is not involved. i.e. classroom teaching-learning with the help of Internet and classroom teaching without the help of internet. Class room teaching without help of Internet can be considered as classroom teaching/learning with PowerPoint presentations of slides contains material available from the internet to the students. In other approach students are required to bring their laptops and face-to-face study can be done. Here conventional classrooms are not fully eliminated. If there is more internet and online learning is involved then it is the form of distance learning [2].

E-learning can be describe in a wide varieties of applications, that’s why may be it is not clear by no means even in peer reviewed journals.

1.1.2 Computer System Based Training / Teaching (CSBT)

Here, Computer System Based Trainings (CSBTs) can be called self paced learning activities which are accessible via a computer system or any other sophisticated devices such as Palmtops, Laptops, Television, Projectors, Mobile Smart Phones. CSBTs generally present contents in a linear mode fashion, much like reading an online books or manuals. Due to this reason they are generally used to teach static processes, such as using software or finishing mathematical equation. The term Computer System Based Training is often used interchangeably with Web based training (WBT) with the primary difference being the delivery style [4].

Researchers have conducted many studies to find out whether CSBT programs can, in fact, produce such beneficial outputs or not. They have divided beaches of
students into different experimental and control groups and have taught experimental groups of students with computer assistance while teaching control students with routine conventional methods only. At the end of a survey or study, the evaluator compares recorded responses of experimental and control students on a scheduled common examination, on a course evaluation form, or on a log of time-on-task. No individual outcome study, however, can tell us whether CSBT is generally effective or not [5].

Generally Computer System Based Training / Teaching is delivered via CD / DVD ROM where as Web Based Training / Teaching is generally delivered via Internet through Web Browsers. In case of CSBTs assessment comes in forms of multiple choice based questions and answers [5]. Results of this assessments can be easily generated and recorded with the help of online application software and can give immediate results to the users and also can give immediate feedbacks too. Users and students can also print this result sheet in the form of a mark sheets / grade sheet certificates. Computer System Based Training provides different experience from the textbook, conventional classrooms and study materials-manuals. Student gets more innovative learning experiences than usual classes. Computer System Based Teaching offers benefits of visual learning with the help of animation and video generally not offered by any other.

Computer System Based Teaching is the very good option to printed material learning because animated powerful media with animations can easily make learning enhanced. Benefit of Computer System Based Teaching is it can be delivered amongst large number of audience at a chipper cost after first development gets completed [5].

1.1.3 Computer System Based Learning (CSBL)

Computer System based learning, is more popularly known as CSBL, and refers to the use of computers as a key component of the educational environment. If we use computers and will take help of computers while learning in the conventional classroom, it can be referred as computer system based learning.
E-learning (or e-Learning) is the use of electronic educational technology in learning and teaching.

Information and communication technology (ICT) in education, EdTech, learning technology, multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer managed instruction, computer-based training (CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT), flexible learning, web-based training (WBT), online education, online learning, virtual education, virtual learning environments (VLE) (which are also called learning platforms), m-learning, and digital education. In usage, all of these terms appear in articles and reviews; the term "e-learning" is used frequently, but is variously and imprecisely defined and applied.[24][25]

These alternative terms are all linguistically more restrictive than "educational technology" in that they refer to the use of modern tools, such as computers, digital technology, electronic media, networked digital devices and associated software and courseware with learning scenarios, worksheets and interactive exercises that facilitate learning. However, these alternative names individually emphasize a particular digitization approach, component or delivery method. Accordingly, each conflates to the broad domain of educational technology. For example, m-learning emphasizes mobility, but is otherwise indistinguishable in principle from educational technology.

1.1.4 Computer System Supported Collaborative Learning (CSSCL)

Computer System Supported Collaborative Learning is a very useful innovation for improving teaching and learning with the use and help of modern communication and information technology [1]. In Computer System Supported Collaborative Learning aim is to give teaching and learning and learning in effective way with the help of both Computer Systems and Internet (i.e. Web Based).
Computer-supported collaborative learning (CSSCL) is a pedagogical approach wherein learning takes place via social interaction using a computer or through the Internet. This kind of learning is characterized by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common resource. CSSCL can be implemented in online and classroom learning environments and can take place synchronously or asynchronously [7].

The field of CSSCL draws heavily from a number of learning theories that emphasize that knowledge is the result of learners interacting with each other, sharing knowledge, and building knowledge as a group. Since the field focuses on collaborative activity and collaborative learning, it inherently takes much from constructivist and social cognitivist learning theories [8].

Only in the last 15 to 20 years have researchers begun to explore the extent to which computer technology could enhance the collaborative learning process. While researchers, in general, have relied on learning theories developed without consideration of computer-support, some have suggested that the field needs to have a theory tailored and refined for the unique challenges that confront those trying to understand the complex interplay of technology and collaborative learning.[9]

Collaboration theory, suggested as a system of analysis for CSCL by Gerry Stahl in 2004, postulates that knowledge is constructed in social interactions such as discourse. The theory suggests that learning is not a matter of accepting fixed facts, but is the dynamic, on-going, and evolving result of complex interactions primarily taking place within communities of people. It also emphasizes that collaborative learning is a process of constructing meaning and that meaning creation most often takes place and can be observed at the group unit of analysis.[10] The goal of collaboration theory is to develop an understanding of how meaning is collaboratively constructed, preserved, and re-learned through the media of language and artifacts in group interaction. There are four crucial themes in collaboration theory: collaborative knowledge building (which is seen as a more concrete term than "learning"); group and personal perspectives intertwining to create group understanding; mediation by artifacts (or the use of resources which learners
can share or imprint meaning on); and interaction analysis using captured examples that can be analyzed as proof that the knowledge building occurred.[9]

Collaboration theory proposes that technology in support of CSCL should provide new types of media that foster the building of collaborative knowing; facilitate the comparison of knowledge built by different types and sizes of groups; and help collaborative groups with the act of negotiating the knowledge they are building. Further, these technologies and designs should strive to remove the teacher as the bottleneck in the communication process. In other words, the teacher should not have to act as the conduit for communication between students or as the avenue by which information is dispensed. Finally, collaboration theory-influenced technologies will strive to increase the quantity and quality of learning moments via computer-simulated situations.[9]

Collaborative learning is a situation in which two or more people learn or attempt to learn something together [11]. Unlike individual learning, people engaged in collaborative learning capitalize on one another’s resources and skills (asking one another for information, evaluating one another’s ideas, monitoring one another’s work, etc.)[12]. More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetry roles[13][14]. Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other [15]. These include both face-to-face conversations[16] and computer discussions (online forums, chat rooms, etc.))[17]. Methods for examining collaborative learning processes include conversation analysis and statistical discourse analysis[17].

Collaborative learning is heavily rooted in Vygotsky’s views that there exists an inherent social nature of learning which is shown through his theory of zone of proximal development[18]. Often, collaborative learning is used as an umbrella term for a variety of approaches in education that involve joint intellectual effort by students or students and teachers [19]. Thus, collaborative learning is commonly illustrated when groups of students work together to search for understanding, meaning, or solutions or to create an
artifact or product of their learning. Further, collaborative learning redefines traditional student-teacher relationship in the classroom which results in controversy over whether this paradigm is more beneficial than harmful [20]. Collaborative learning activities can include collaborative writing, group projects, joint problem solving, debates, study teams, and other activities. The approach is closely related to cooperative learning [21][22].

Alternatively, collaborative learning occurs when individuals are actively engaged in a community in which learning takes place through explicit or implicit collaborative efforts. Collaborative learning has often been portrayed as solely a cognitive process by which adults participate as facilitators of knowledge and children as receivers. However, Indigenous communities of the Americas illustrate that collaborative learning occurs because individual participation in learning occurs on a horizontal plane where children and adults are equal. Thus collaborative learning also occurs when children and adults in engage play, work, and other activities together [23].

1.1.5 e-Learning Outcomes

![Diagram of e-Learning Outcomes](image)

Figure 1.1 e-Learning based Outcomes
e-Learning can have variety of outcomes and usages towards the conventional learning. The following table illustrates some out of it.

<table>
<thead>
<tr>
<th>INFORMATION AND COMMUNICATION TECHNOLOGIES (Information Age)</th>
<th>TRADITIONAL SCHOOLING (Industrial Age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World of learning</td>
<td>World of knowledge</td>
</tr>
<tr>
<td>Customized</td>
<td>Standardized for groups</td>
</tr>
<tr>
<td>Freedom with certain accountabilities</td>
<td>Predetermined control</td>
</tr>
<tr>
<td>Co-operative and social relations</td>
<td>Individual performance</td>
</tr>
<tr>
<td>Collective decision making</td>
<td>Unilateral decision making</td>
</tr>
<tr>
<td>Taking on initiatives</td>
<td>Compliance</td>
</tr>
<tr>
<td>Rich and diverse thinking</td>
<td>Conformity</td>
</tr>
<tr>
<td>Shared networks</td>
<td>One way communication with some feedback</td>
</tr>
<tr>
<td>Holistic</td>
<td>Systems</td>
</tr>
<tr>
<td>Concerned with process</td>
<td>Concerned with parts</td>
</tr>
<tr>
<td>Learning and learners are paramount</td>
<td>Teaching and teachers are paramount</td>
</tr>
<tr>
<td>Multiple media</td>
<td>Usually face to face with print media</td>
</tr>
</tbody>
</table>

Table 1.1 Opportunities of e-Learning with respect of outputs

- Class work can be scheduled around personal and professional work
- Reduces travel cost and time to and from school
- Learners may have the option to select learning materials that meets their level of knowledge and interest
- Learners can study wherever they have access to a computer and Internet
- Self-paced learning modules allow learners to work at their own pace
- Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms
Different learning styles are addressed and facilitation of learning occurs through varied activities

Development of computer and Internet skills that are transferable to other facets of learner's lives

Successfully completing online or computer-based courses builds self-knowledge and self-confidence and encourages students to take responsibility for their learning

1.1.6 Supportive Points of e-Learning to the Trainer or organization

Cons of e-Learning

- Unmotivated learners or those with poor study habits may fall behind
- Lack of familiar structure and routine may take getting used to
- Students may feel isolated or miss social interaction
- Instructor may not always be available on demand
- Slow or unreliable Internet connections can be frustrating
- Managing learning software can involve a learning curve
- Some courses such as traditional hands-on courses can be difficult to simulate [27][28].

Pros of e-Learning

There are several benefits of benefits. Some of it are listed as follows.

- Class work can be scheduled around work and family
- Reduces travel time and travel costs for off-campus students
- Students may have the option to select learning materials that meets their level of knowledge and interest
• Students can study anywhere they have access to a computer and Internet connection
• Self-paced learning modules allow students to work at their own pace
• Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms
• Instructors and students both report eLearning fosters more interaction among students and instructors than in large lecture courses
• eLearning can accommodate different learning styles and facilitate learning through a variety of activities
• Develops knowledge of the Internet and computers skills that will help learners throughout their lives and careers
• Successfully completing online or computer-based courses builds self-knowledge and self-confidence and encourages students to take responsibility for their learning
• Learners can test out of or skim over materials already mastered and concentrate efforts in mastering areas containing new information and/or skills [27][28][29]

1.2 University Teaching and Learning System

Generally, University Teaching and Learning pattern is based on the conventional syllabus which is created by the panel of approved and expert University teachers and other members of the board of University councils. e-Learning adoption in campus Universities has still not realized their potential to satisfy the expectation and needs of the current century students and learners [40].

• **Hard systems** thinking assumes that the perceived world contains systems which can be the subject of a systematic process of enquiry. Ultimately such systems, once understood, can be engineered.
• **Soft systems** thinking takes the stand that the process of enquiry is itself a system. In other words, the process of making sense of the world is a learning system [30].

Teaching and learning in the language classroom is aimed primarily at language teachers with some experience, and though it could be very useful for teachers to explore on their own, its main use is likely to be as a core textbook on in-service training courses. Throughout, it encourages teachers to reflect on issues in language teaching and learning on the basis of their own experience. Each chapter begins with an “introductory task” which focuses thought on the area to be considered and which in most cases invites teachers to identify aspects of their current ideas and practice on the issue. Similarly, the penultimate section of each chapter is a considerable list of “discussion topics and projects”, many of which are based on examples of teaching materials. These activities are likely to be most profitable when carried out in groups, and the most obvious way in which to exploit them is on a formal training course [42].

### 1.3 Adaptive e-Learning and adaptability

The World Wide Web has become an increasingly powerful, global and interactive medium for sharing information. The advances of web technologies have boosted development of new learning experiences for students. One of the first types of web application for delivering instruction via the Internet is web-based instruction that is now known as e-learning. E-learning is a hypermedia-based instructional program that utilizes the Attributes and resources of the Web to create a meaningful learning environment [42]. E-learning is just the integration of the traditional Computer Assisted Instruction (CAI) or Computer Based Training (CBT) into web technology. Since then e-learning has been a hot research and development area. Benefits of e-learning are both classroom and platform independence. There are many e-learning systems available on the Internet, but they provide only the same plain hypertext pages to all students regardless of individual ability. In many current web-based courses, the course material is still implicitly oriented for a traditional on-campus audience consisting of homogeneous,
Test → Transfer → Training → Assessment → Maintenance

Figure 1.2 Knowledge v/s Time 1
Figure 1.3  Knowledge v/s Time 2
well-prepared and well-motivated students. However, web-based courses are used by a much wider variety of users than any campus-based courses. These learners may have very different goals, backgrounds, knowledge levels and learning capabilities. A web-based course designed for a specific group of users, like a traditional course, may not fit other users. Therefore the course material needs to be flexible so that different students may get different materials and an order of presentation that depends upon their own characteristics [42].

**Training based on the students’ personal knowledge level:**

Adaptive learning assures that the training focuses automatically on those subjects that require training. You know that you find certain areas more difficult than others. The A New Spring e-learning focuses more on your weak points. The training is created automatically for a specific student to fit its individual points of attention.

**Work towards the students' goal:**

We help students achieve their goals like preparing for an exam or maintaining their skills. Our "digital mentor" adjusts the students' learning scheme on a daily basis so they will achieve their goal.

**Do not study more than necessary**

A New Spring takes into account the subjects that you, as a student, already comprehend. You can focus on what you do not yet comprehend. Keeping knowledge active takes less effort than re-acquiring a subject. By repetition you gain more return from your lessons. As a result you study efficiently; you do not study more than necessary.
Not too difficult and not too easy

Well-balanced challenges and immediate feedback stimulate the flow experience and thus the study results. A New Spring assures that your training matches your skills, so not too easy or too difficult. After an exercise students can immediately view what they mastered, what they do not master yet.

More study discipline through daily reminders

Small lessons and exercises are offered on a regular basis, so the training takes relatively little time and effort per session. A student is reminded per e-mail on a regular basis of open exercises. This stimulates regular training.

Your content becomes adaptive automatically

Your content becomes automatically adaptive when it is available in the platform of A New Spring. You do not have to ‘program’ anything for this. You can add extra features to your content to increase the adaptive capacity of your training material.

1.4 Virtual Environments to facilitate adaptive e-Learning

Nowadays, with the improvement of communication and collaboration services, the web-based educational systems have revolutionized systems supported with on the so-called virtual learning communities, where students and tutors collaborate each other in order to acquire the desired learning goals. In this situation, the mere fact of setting up an environment for students and lecturers does not guarantee mutual collaboration or successful student learning. This is partly due to the fact that just one response is given to
users with changing needs depending on their level of experience in the use of the resources available on the website. Thus, it is desirable to provide some adaptation to the students. Nevertheless, the intensive use of the communication and collaboration services and thus the new kind of input data for adaptation has forced a change in the user models, which are used as the basis for adaptation in these systems. In this paper we will describe the basis of a user model within a web-based collaborative learning environment. We will describe some adaptation tasks developed and that are based on that user model. At the end the empirical evaluation carried out on the system will be shown.

Nowadays the proliferation of accesses to the Internet has made the World WideWeb (WWW) an ideal environment for communication between a lecturer and students overcoming time and space constraints. This development is changing the teaching model, and nowadays lecturers and students are becoming active members of virtual educational communities. However, the mere fact of setting up an environment for students and lecturers does not guarantee mutual collaboration or successful student learning. In fact, in many instances a significant number of students are reluctant to actively participate in collaborative course activities. This is partly due to the fact that just one response is given to users with changing needs depending on their level of experience in the use of the resources available on the website. Thus, certain adaptation to the student is desirable. In this situation, the adaptation tasks must help both the student in his/her collaboration in the course and the tutor in the management of the community. In addition, in order to make possible the use of a collaborative environment on a variety of courses, it is necessary to guarantee that these tasks will be domain independent.

1.4.1 Existing Virtual Learning Environments

Some Existing Virtual Learning Environments (VLEs)

(A) Learning management systems
- Cornerstone OnDemand - Learning and Talent Management Systems
- Alphastudy - a web and mobile enabled LMS
- Claroline
- Desire2Learn
- JoomlaLMS - a LMS based on Joomla platform
- LAMS - the Learning Activity Management System
- RCampus - a course and ePortfolio management system
- Saba - learning management system and social learning
- SharePointLMS - a LMS based on MS SharePoint
- ITWorx_CLG

(B) Course management systems

- CCNet
- Coggno - e-learning software platform and courseware creation toolkit
- Chamilo
- Claroline
- Democrasoft
- Dokeos
- eFront
- ILIAS
- Moodle
- Sakai

(C) Virtual learning environment

- Alphastudy - Learning and knowledge portals
- Moodle - An open source (free) modular php virtual learning software
- Blackboard - A family of virtual learning software
- Democrasoft - Collaborize Classroom - A free online learning platform for teachers and students
- CyberExtension - Virtual Managed Learning Environment
- Desire2Learn - A suite of learning software
- EON Experience - A library of 3D virtual learning objects that may be imported into EON Creator to author customized virtual learning environments, which are also capable of being displayed in stereoscopic 3D.
- eSchools - A primary school online system
- elearnapp - An all-around school management solution
- Elluminate Live - An interactive classroom environment
- FirstClass - Messaging and communications solution
- Heritage Key – Virtual historical environments, such as Tutankhamun’s tomb.
- Instructure - A full-featured, open-source learning platform
- itslearning - Norwegian Learning Environment, delivered as Software as a Service (SaaS), market leader in Norway, Sweden and UK.
- Mingoville - Introduction to the English language. Age 8 to 12 (Virtual World and Language games)
- RCampus - A Learning and ePortfolio Management System with both personal and institutional access
- Saba Centra - Part of a Human Capital Development System with Social Learning and Realtime Collaboration capabilities
- SANSSpace - Course/Content Management with Digital Comparative Recorder for language learning.
- SpicyNodes - Create and share radial maps (related to concept maps and mind maps)
- WebCT - (Now a part of Blackboard) Software applications designed to enhance teaching and learning
- WebTrain - Virtual live classes, enrollment, attendance, attention monitoring.

### 1.5 Current Status of adaptive e-Learning

Although University teaching is organized within disciplinary departments, with support systems that work across disciplines, the educational literature indicates that teaching in traditional campus Universities is largely dependent upon the strategies developed by individual lecturers. Institutional support systems and disciplinary
departments can all be viewed through the lens of individual lecturer strategies. Links between theories of individual cognition and theories of organizational adaptation account for the role of diversity in individual strategies, including the influence of academic disciplines.

There is a wide variation in disciplinary understanding of knowledge, of learning and teaching, and of how teaching is best organized. There are different belief systems, different forms of academic community organization, different teaching and learning regimes. Some educational theorists seek to provide a uniting overview based on the principles of educational psychology. Others take a more pragmatic view and recognize the difficulties in attempting to rebuild teaching and learning regimes from first principles. E-learning literature pays attention to the social dimension of learning whereas classroom teaching literature often focuses on the individual teacher or learner, leaving the social dimension tacit.

This diversity is inevitable, in that disciplinary teaching is a result of many diverse influences. Any individual teacher, or educational support professional has access to only a limited subset of these influences. All have different maps of what it is to be a University teacher. Complex adaptive systems theory shows that this diversity is not only inevitable, but desirable, as it adds to the University's ability to adapt. The main barrier to adaptation in learning and teaching systems is not diversity, but a lack of connection between disciplines. There is a scarcity of pathways between the different disciplinary teaching and learning.

The role of micro diversity, in the form of widely varying individual capabilities and potential strategies, explains how a small amount of networking and sharing of e-learning knowledge between disciplines can grow. An increase in the range of strategies available to some individuals drives a positive feedback loop that opens up more strategy options for others. In terms of the metaphor in Figure 4.7, once a few pioneers map out safe routes for others to follow, the routes can eventually become well-trodden paths as more people use them.
Following figure illustrates the interplay between discipline context and the three components of individual teaching strategy in terms of the ProForMaC framework. The teacher's individual practice (the process of teaching), the form of their beliefs and theories, and the resources and capabilities afforded to them (including time and technology), all interact in the context of a disciplinary teaching and learning regime.

Figure 1.4 Scenario of Adaptive e-Learning

1. The way that individual teachers from different disciplines link up experiences and perceptions of University learning and teaching to form their strategies for using E-learning adoption in a campus University as a complex adaptive system: mapping lecturer strategies technology will provide information about the diversity of perceptions and motivations in those strategies.
2. The effect of cross-discipline networking on the diversity individual teacher strategies for using e-learning, will show how organizational adaptation can develop as a result of networking.

3. Patterns that are common to many strategies for e-learning will indicate complementarities at the institutional level, as experienced in different ways by individual teachers

When online courses first began, the primary mode of delivery was through a two way audio-visual network. Then as well as now, many of the virtual study programs were mainly based on text documents, but multimedia technologies have become increasingly popular as well. These web-based delivery modes are used in order to expand access to programs and services that can be offered anytime and anywhere. The spectrum of teaching modes in virtual education includes courses based on hypertext, videos, audios, e-mails, and video conferencing. Teaching on the web through courseware such as WebCT and Blackboard are also used [30].

Leem, Junghoon, Lim, Byungro [43] mentioned the purpose to examine the current status of e-Learning in Korean higher education and find ways to encourage the further use and development of e-Learning systems that aim to enhance academic competitiveness. A total of 201 universities in Korea (27 national and public, 163 private, and 11 national universities of education) were examined in this study. At the time of the study, 85 percent of the universities and colleges had investigated implementing e-Learning. There were special e-Learning teams in most national and public universities, as well as private universities and colleges. Findings from this study found that both teachers and learners alike, lacked meaningful support systems and opportunities to actively participate in e-Learning programs. Although such lack of support was found to be endemic, such lack of support and opportunity was found to be more acute in private universities, private colleges, universities of education, than mid-sized, small-sized, and provincial universities and colleges. Except for a few mid- and small-sized universities
and colleges, most large universities and colleges were equipped with technical support such as infrastructure and operational platforms. These same schools, however, did not provide institutional support, nor did they employ appropriate policies needed to further the quality and enhancement of e-Learning offerings. Also, there was no meaningful link found between schools and industry, nor was there adequate financial support in place for the implementation of e-Learning systems, simply because many universities failed to allocate sufficient funding for e-Learning. In conclusion, the strategies for enhancing university competitiveness through e-Learning are as follows: 1) establishing support strategies according to the types of universities; 2) developing quality assurance systems for e-Learning; 3) enhancing support systems for professors and learners; 4) developing knowledge sharing systems between schools and industry; 5) enhancing international collaboration for e-Learning; and 6) developing and supporting e-communities of knowledge for research and education. (Contains 9 tables.) [This article was published in the Regional Focus Issue: Changing Faces of Open and Distance Education in Asia.] [43]

- Disciplines, departments and diversity

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