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ORIGINAL ARTICLE

EXPLORING PEPPER TO INTRODUCE E-LEARNING FOR PRE-SERVICE TEACHER EDUCATION PROGRAMME AT THE M. S. UNIVERSITY OF BARODA

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Abstract:

Growing demands of Information and Communication Technology open a new door to communicate, sharing, and delivery of Knowledge. Ultimately it leads Nations to Globalisation of Education.Information and Communications with the cooperation of different sectors make available the benefits of new technologies, especially in providing education.(United Nations, 2011).In order to meet the growing demand for higher education, Information and Communication Technology (ICT) be explored in the form of e learning programmes. E Learning provides learners to learn as per their time and Pace. Drill and Practice provides strong understanding of the concept. At the Pre-service Teacher education Programme, e-learning developed basic skills to teach student of Technology driven next generation students. Researchers tried to develop E Learning Program and implement this program with the help of E learning tool PEPPER. Objectives of Study are 1) To develop E Learning program, 2) To implement developed E Learning program. 3) To study the effectiveness of Developed E Learning Program. Study is Pre experimental in nature and Tool used for data collection are Achievement test and Opinionnaire.

KEYWORDS:

E-Learning, Pepper, ICT.

INTRODUCTION

The past several decades has witnessed significant changes in terms of instructional methods used, and the communicationtechologies employed. These days, computers are widely used as i) instructional media, ii) a mode of communication between classmates or between the teacher

and students, and iii) an essential source of information. Today, the central Government of India is actively exploring ways to realize the full potential of technology for education and improve quality of instruction throughout the country. In 1986, the central government formulated the National Policy on Education (NPE), followed in 1992 by the Programme of Action (POA). In

both of these initiatives, technology was viewed as playing a central role in the reform and ongoing improvement of the nation's schools.

Since those early years, computers have become anincreasingly important tool for education. Internet facilities and a growing ICT (Information and Communication Technologies) sector are offering new possibilities for online learning. Using these tools, India has an opportunity to develop an educational

infrastructure that will keep pace with the country's rapidly changing global profile. To meet the tremendous demand for post-secondary education in India – with literally millions of students – e-learning will need to emerge as a key delivery mechanism. However, according to Dalal (2006), this cannot be achieved effectively through simple technology alone. We also need to understand the concept of e-learning and the distinctive nature of this type of pedagogy.

CONCEPT OF E-LEARNING:

E-learning is defined as the use of digital technologies and media in the teaching-learning process. It ranges in complexity from the simplest forms, such as making available lecture notes in electronic format, through to podcasts, online real-time teaching and virtual realities. E-learning may include the use of web-based teaching materials and hypermedia, multimedia, CD-ROMs or web sites, discussion boards, collaborative software, e-mail, blogs, wikis, computer aided assessment, educational animation, simulations, games, learning management software, electronic voting systems and more. Most forms of e-learning employ a combination of different methods (Fee, 2010).

Different researchers have examined different attributes of e-learning. According to Naidu (2006), e-learning is increasingly associated withonline forms of instruction, such asvirtual learning, distributed learning, network and web based learning: educationalprocesses that utilize information and communications technologyto mediate asynchronous as well as synchronous learning and teaching activities.Elliott Masiefocuses on the EXPERIENCE dimension of e-learning, which includes such factors as: engagement, curiosity, simulation, and practice.Likewise, Sanderson (2002) argues thate-learning involves more than traditional training and the delivery of information. Rather, e-learning is also about fostering 21st century skills. E-learning is a very broad term that lacks a concise definition. In it's most basic form, it is used to describe any type of learning environment that is computer enhanced.

DEVELOPMENT OF E-LEARNING:

The development of e learning has taken up in a phased manner. The founding stone of the e learning was the distribution technology which supported the instruction-centered approach and information transfer learning objectives. In the second phase of development the various media such as television, audio recordings and, in some cases, courseware saved on floppy disks were explored. Teacher and learner interaction remained almost unchanged from that of the first generation, although it was supported by telephone, fax, etc. Communication between learners was almost non-existent and education seemed merely designed to bridge the geographical gap. Hence, education was no longer seen as a social activity centered on learner-to-learner interaction, but rather as an almost totally individual pursuit (Trentin, 1997). Interactive technology was the foundation of the generation that allowed the learner to progress at his or her own pace towards skill acquisition. The underlying pedagogical assumptions were learner-centered approach, where student interprets information. The third phase of development started by emphasizing the concept of learning as a social activity involving extensive use of the computer network. The system was also known as online education or network-based education.

Kaufman (1989) characterizes the three generations as a progressive increase in learner control, opportunities for dialogue and emphasis on thinking skills rather than mere comprehension. This is represented in the following figure 1.
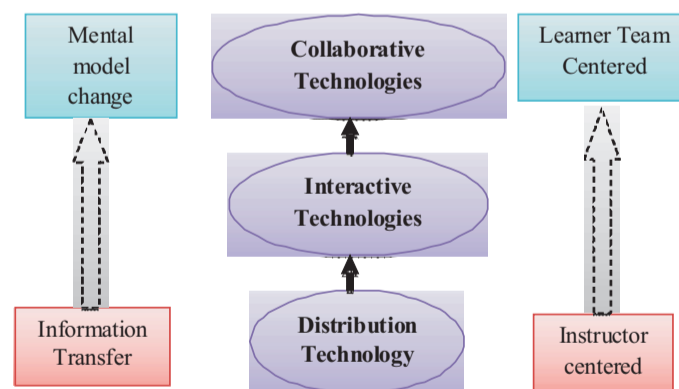
Figure 1. Instructional model and technological developments

Technology has further provided scope to view curriculum, from Multiple Intelligence perspective by providing many ways of learning which are not there in traditional ways. Multimedia design projects are another effective way to develop student higher order thinking skills for example web Quest are popular as they help student focus on actually using information, not just acquiring it and student must then analyze, synthesize and evaluate the information.

MODELS OF E-LEARNING:

E-learning is not only to study materials online but on the basis of nature of E-learning in terms of mode of interaction and accessibility of resources it has different types.
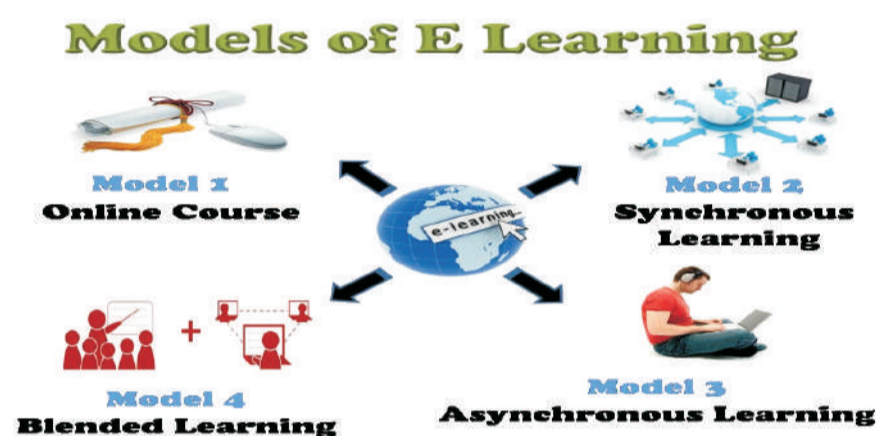
Figure 2 Models of E-learning

Singh (2003) gave four types of E-learning Model on the basis of this which is stated as follow:

Table 1: Difference Types of E-learning and Models of E-learning given by Singh (2003)

Model 1	Online Courses	Most of the interaction in the course takes place through use of the communications network and the computer.	Online Meetings Online Learning Online Conference Communities and Discussion Forums Instant Messaging
Model 2	Integrated and Offline Learning (Blended Learning)	Integrating transmitting the course online together with other sections that are given in the traditional fashion.	Combination of model 3 and model 4
Model 3	Self managed e-Learning (Asynchronous Learning)	The possibilities embodied in the Internet enable teachers gives Information on the Web, usage of resources available in the network, and usage of sources as regards the material studied in the course.	Documents & Web Pages Web/Computer Based Training Modules Recorded Live Events Online Learning Communities and Discussion Forums Distributed and Mobile
Model 4	Live E-Learning Synchronous learning)	Using computer communications media enables holding discussions, handing in exercises, carrying out collaborative learning among learners, and transmitting information from the teacher to the learners.	Online Meetings Virtual Classrooms Web Seminars and Broadcasts Coaching Instant Messaging Conference Calls

All the Models have equal scopes of interaction and opportunity of sharing and development of ICT Competencies among learners. All the models encompassed common components for delivery.

Components of E-Learning:

According to Fee (2010), Chadha and Kumail (2002) Components of E-learning are:
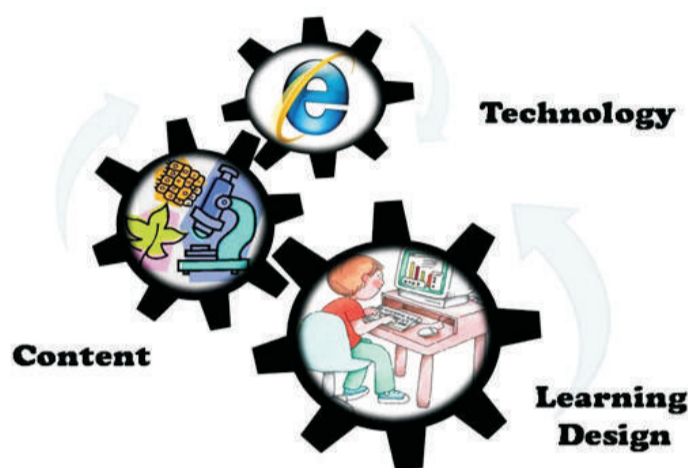
Figure 3 Components of E-learning.

· Technology: It consist of any Information and Communication Technology like Computer, Internet, CD- ROM, or any media in electronic form
· Content: It consist of Content of which we are interested to develop Learning Material and this Developed Learning materials are viewed by Learner and
· Learning Design: Learning Design means mode of interaction in E learning. As per the requirement of Learner Program designer select mode of transition as mentioned in Figure 1.1 Models of E learning.

ADVANTAGES OF E-LEARNING:

E-learning has potential to achieve goals of Education as well as Institution. It plays many advantages and Nelasco et al. (2007) listed few of them are listed as below:

1.Sharing information along with Learning: A Chinese proverb says, 'Tell me, and I'll forget. Show me, and I may remember. Involve me, and I'll understand'. Difficult or dull subjects can be made more interesting, easier and more appealing by e learning.
2.Knowledge- A performance boosting capsule, anytime, anywhere: On-demand availability enables them to remove stress. E Learning empowers you to take charge of your learning and to access online library resources.
3.Accessibility to Remote Learner: Since E Learning has ability to cover distances, education is reach up to interior part of the nation. Recorded lectures and Videos shown to students of the rural area.
4.Catering to a much larger number of learners: we can interact from anywhere and anytime. Distance does not matter. We can share our knowledge with the help of ICTs.
5.Learning Communities: we can interact with our friends and colleagues by developing learning community.
6.Cost- Effectiveness: E Learning makes the best knowledge products available at an affordable rate by cutting down the travel and extra living expenses. Overall cost for the organisation is also reduced.
7.Structural Feedback: Learner gets constant feedback and teachers also give feedback in systematic manner.
8.Real time, Self Paced: As per convenient of the students they can study. Drill and Practice is possible. So Slow learner learnt as per their pace.
9.Learners as the centre of Focus: Student centred learning is possible. So maximum leaning is possible.

10.Individualized Instruction: E learning also offers individualized instruction, which print media cannot provide. It makes learning exciting, engaging and compelling.

NEED OF E LEARNING IN EDUCATION:

According to Singh and Sharma (2005), education is one of the fastest growing economic and social sectors in the world, and the use of new technologies is an integral and driving component of that growth.Hrastinski (2008), who defined e-learning as learning and teaching online through network technologies, argues that it is offers one of the morepromising solutions to the growing need for anytime-anywhere education. It may be a particularly valuable tool for highly populated nations such as India that are undergoing rapid economic growth. As Dalal (2006) observes, e-learning can raise the level of education, literacy and economic development. This is even true in countries where technical education is expensive, opportunities are limited, and economic disparities exist. However, to be successful, existing methods which are predominately based on rote learning, lectures and the reproduction of information need to be replaced by interactive modes of teaching which are more learner-centered. Independent thinking, problem solving skills, planning, and collaborative skillsneed to be fostered. This transforms the teacher's role into one of organizing the learning environment and providing ongoing coaching and support for the students. Research suggests that students learn best when they are driven by a genuine desire to understand. Thus, the challenge facing the teacher is to induce a spark of curoisity in students and nurture a love of learning.

NEEDS OF E-LEARNING IN INDIAN CONTEXT:

India has made considerable progress in school education sinceindependence with reference to overall literacy, infrastructure and universalaccess and enrolment in schools.The launch of the massive Sarva Shiksha Abhiyan (SSA) in 2002 to improve quality of School Education and for the financial commitment and education processes supplement with Universalization of Elementary Education (UEE)in the form ofthe Right of Children to Free and Compulsory Education Act, 2009. A similar demand may arise in thecontext of the impending universalization of secondary education in the coming years (NCFTE, 2009). The new concerns of school curriculumand the expected transactional modalities have been emphasized all stages of school education. Issues related to ICT in schoolingas well as e-learning become the centre-stage in Teacher Education. The National Knowledge Commission (2009) has observed thatteachers are the single most important element of the school system and thecountry is already facing a severe shortage of qualified and motivated schoolteachers at different levels. Forums thatallow and encourage teachers to exchange ideas, information and experiencesincluding a web-based portal should be developed. Teachers must know basic hardwareand software operations, as well asproductivity applications software, aweb browser, communications software,presentation software, and management applications to use common communication and collaborationtechnologies, such as text messaging, videoconferencing, and web-based collaboration and socialenvironments. E-learning can support students' understanding andapplication of subject matter knowledge and waysin which the use of this technology can supportproject-based learning. E.g. studentsused the web include collaboration via online dialogues or real timecommunication with experts and apply diversity of Knowledge to identify ways of protecting ecological systems. Teacher should know to used ICT to communicate and collaborate withstudents, peers, parents and the larger community inorder to nurture student learning and helps student to understand keyconcepts, students employ open-endedtechnology tools that are specific totheir subject area, such as visualizationsin science, data analysis tools inmathematics or role play simulations inSocial studies(UNESCO ICT-CFT, 2011). Teacher education needs to orient and sensitizethe teacher to distinguish between critically useful, developmentallyappropriate and the detrimental use of ICT. In a way, ICT can beimaginatively drawn upon for professional development and academic supportof the pre-service and in-service teachers.

One of the most effective ways of achieving globalisation of Education wouldbe to stimulate the development and dissemination of quality Open Access (OA) materials and Open Educational Resources (OER) through Integration of E-learning withInternet. This would facilitate easy and widespread access to high quality educational resources and drastically improve the teaching paradigm for all our students.Sustainable development of Open aces of resource relevantto India is somewhat difficult and expensive also. Emerging international andnational initiatives are offering Open Learning Environment as open resources. NKCfound that there are already 200-300 free knowledgesources available across the world. It is vital for India topull these initiatives.National Knowledge Commission (2009) recommended to create online Open Educational Resources(OER) through a collaborative process, pooling in the efforts of

institutions of higher education and must develop a network-enableddelivery infrastructure with a focus on two primaryareas: access and delivery. For it,high bandwidth connections across institutions connectivity to global networks are essential.

PRESENT SENARIO OF E LEARNING IN INDIA:

EDUSAT is a communications satellite which was launched on 20 September 2004 by the Indian Space Research Organisation. EDUSAT is currently used by the following institutions: IGNOU (India Gandhi National Open University); Nodal Institution; AICTE (All India council for Technical education); ICAR (Indian Council of Agricultural Research); NCERT (National Council of Educational Research and Training); UGC (University Grant Commission) and others. A number of groups providing ongoing support for these services, including NIC (National Informatics Centre), ERNET (Education and Research Network), INFLIBNET (Information and Library Network), and C-DAC (Centre for Development of Advance Computing). They serve as educational and technology facilitators in India, and co-operate in the delivery of multi lingual E-learning systems (Kushwah and Vijayakumar, 2011).

E learning has already significantly changed the academic landscape of India. There are many established e-learning projectsthatsupport online teachinginitatives, such as the Intel Teach to the Future programme, the Goa Schools Computers Project (GSPC), and the "Indo-US E-learning initiative" program (Khirwadkar and Pushpanadhan, 2010). In addition, the Sakshat Portal from MHRD (Ministry of Human Resource Development), which was modelled on MIT's OCW (OnlineCourseWare), has been designed and developed by IGNOU for Ministry of HRD (Sahay, 2009).

In addition to the aforementioned projects, many schoolsanduniversities have developed their own online e-learning sites where students interact online and access information.Many private institutes have takenan interest in the development of e-learning and,in response to the demands of their students, have developed Internet-based programs and adopted innovative methods of teaching and learning. Many of these advances have occurred in the field of science and technology, where electronic media has quickly gained a foothold in post-secondary institutions.

PEPPER: A TOOL FOR E LEARNING:

According to Hrastinski (2008), Web 2.0 emphasizes the increasing use of the web to support social relations. This is particularly important in distance contexts, where students have traditionally lacked the kinds of social interactions that they typically enjoy in a face-to-face classroom. Having a social dimension in online learning is important, because it provides opportunities for students to work together and learn from each other. Typically Web 2.0 educational environments include the adoption of emerging media such as virtual worlds, blogs, wikis, video sharing, and synchronous software that supports audio and video.

Pepper is web-based educational environment that creates a knowledge-building forum for teachers and their students. The software, designed by Professor Jim Hewitt at the Ontario Institute for Studies in Education, University of Toronto,helps students to work individually or collaboratively in an on-line classroom. The students' participation is largely comprised of reading questions, creating responses (in text) and engaging in a discussion with other students about course materials.
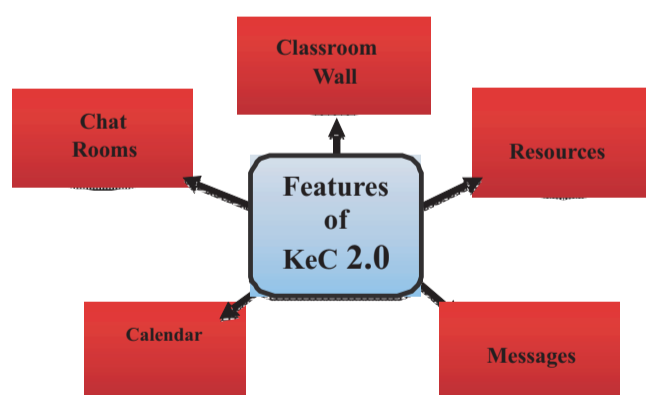

Figure 4: Main Features of Knowledge eCommons 2.0

Students in Pepper can access forums and participate in on-line learning in a variety of ways. The primary means of interaction is through the reading and writing of text-based messages in a threaded discussion. Studentstypically pose questions, share resources and collaborate with classmates in the forums. They can also write "private" notes to their teacher, or their classmates, or work together on "group-editable" notes. Other useful features for students include:

"Classroom Wall" where students can pose a question to the class, or offer a response.
"Chat Rooms" where students can discuss topics with other student in real-time chat.
"Calendar" where students can see the course schedule, assignment deadlines, etc.
"Messages" which allow students to send each other private information
"Resources" which contain all the developed learning materials.
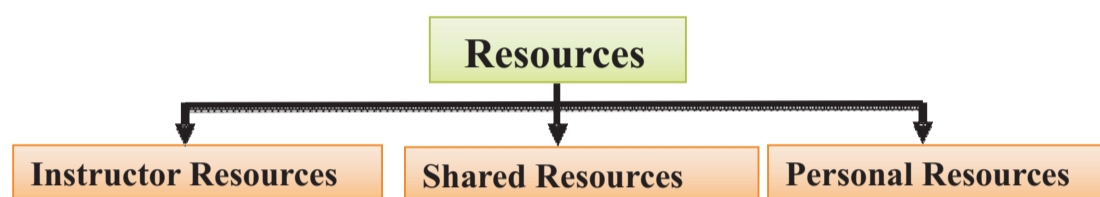
Figure 5: Different types of Resources under the Resources of KeC 2.0

Pepper is continually improved in response to users' needs and through a systematic process of protyping and testing new features (Hewitt, 2010).

REVIEW OF LITERATURE:

A number of studies have been carried out on E-learning are at international level but very few studies were found at national level. The reviews studied revealed that studies carried out adopted Survey method. Cuneo & Harnish (2002), Kim and Bonk (2006) were collect data through online Survey. Pingle (2010), Fomsi and Njoku (2011) were prepared Questionnaire regarding Readiness of Students for E-Learning. Pingle (2010) conducted her study in India and Fomsi and Njoku (2011) conducted their study in Nigeria. Results revealed positive response toward e learning. Schnackenberg et, al. (2001) conducted a case study of needs assessment in teacher in-service development. Diwakar et al. (2011) did case Study of Virtual Labs of Amrita Vishwa Vidyapeetham (Amrita University), Kerala. Hedberg and Ping (2004) studied E-leaning as Innovation in Asian School. Ruiz et al. (2006) conducted study on Impact of E-learning on Medical Students and Hrastinski (2008) focused on the benefits and limitations of asynchronous and synchronous e-learning.

Many Studies conducted were Qualitative in nature. Observation Schedule were designed by Researcher and discuss observation in their research work like study of Bures et, al. (2000), Craig (2001), Baric et, al. (2007), Lazarevic (2007). In Many Studies data were collected through interview like study of Zivkovic et al. (2007). According to these researches, students enjoy and learn more through online learning and progress was seen in terms of their academic achievement and gross learning. Many studies were deal with development of E learning software, electronic materials and discuss problems and use of software in growth of institute like study of Mandic et al. (2007) in area of metal forming, Zivkovic et al. (2007) in Engineering Graphics, Stefanovic, K. (2007) develop Laboratory Experimental Setups. Milisavljevic et al. (2007) was developed Surgery E-Learning Course, Stevanovic, D. (2007) in Mathematics, Lazarevic (2007) were developed for Andragogy of Communication and Media and Bajcetic et al. (2007) introduced LMS - Blended Course for the Development of University Professors e-Learning Skills.

Many Researchers developed E-Learning Site with the help of MOODLE which is free E-learning software for Electronic teaching learning Process. They develop Learning Material of their respective Course and make it available for students 24 hour. Karem (2010) integrated E-learning with Biology at school level and results revealed positive learning in Biology and learning is possible with fun through e-learning.To explore the use of Pepper for the teaching of Biology methods, offered at M.S.University of Baroda in theB.Ed. Program, we designed an experimental study with the following objectives.

OBJECTIVES OF THE STUDY:

To explore the use of Pepper as an e-learning program for student teachers in a Biology methods class;
To study the effectiveness of this e-learning program for student teachers in terms of their academic performance.
To study the opinions and experiences of students and teachers who used Pepper in the Biology methods class.
To better understand the effects of Pepper on student performance, we collected and analyzed student scores on a pre-test and post-test. We developed the following null hypothesis:

Null Hypothesis:

· There will be no significant difference between the pre-test mean score and the post-test mean scores of student teachers on the achievement test.

METHODOLOGY OF THE STUDY:

Population and Sample: The study was conducted in Vadodara city of Gujarat State. The population and sample of the study was same (i.e., all students were part of the study). Seventeen student teachers were enrolled in a Biology Teaching course during the 2011-12 academic year in the Department of Education and Psychology at the M.S.University of Baroda, Gujarat, India. All seventeen student teachers comprise the sample for the present study.

DESIGN OF STUDY:

Phase1: Development of the E Learning Programme:

Starting with an empty Pepper community area, the research team designed and uploaded course materials onto Pepper so that students could view the study material and participate in online discussion. In addition, researchers also provided a DVD to each student so they could access the material at times that were convenient for them. The researcher interacted with students on the internet and simultaneously gave them practical work to complete. This was work was subsequently discussed during the offline class. Thus a blended learning approach was followed in this particular e-learning program.
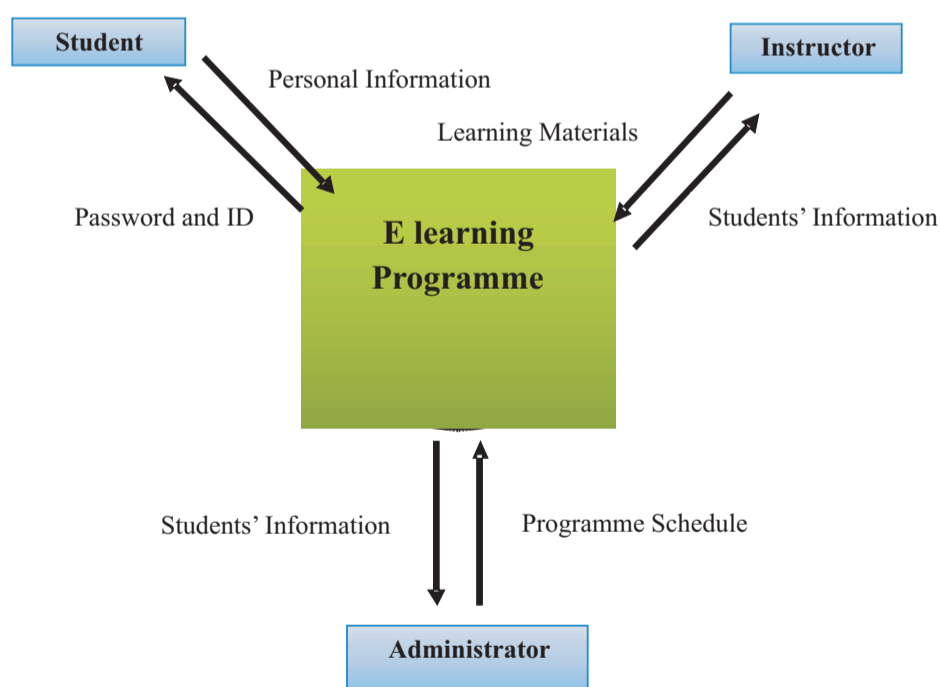
Figure 6: Context Diagram of Pepper

To prepare students for their work in the course, certain information was collected. Each student enrolled in the Biology courses provided personal information, including their name and email address. This information was given to the teacher and the online administrator. The online administrator opened online accounts forstudents and provided them with a userid and password. The teacher then developed learning material on selected topics which was subsequently uploaded and made available on DVD.
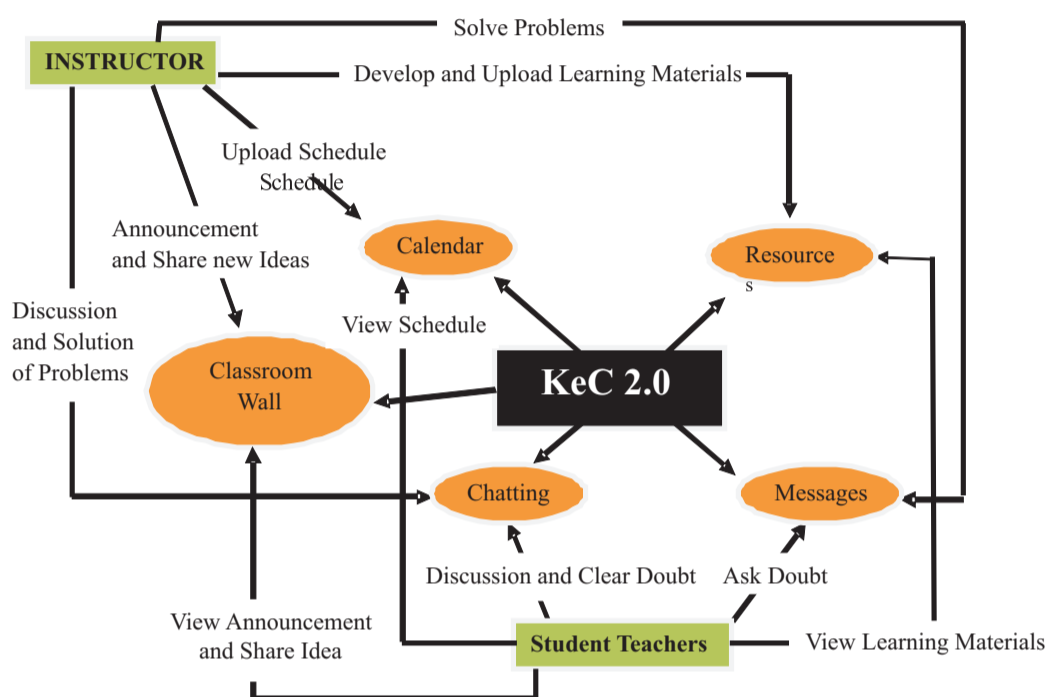
Figure 7: Interaction between Instructor and Student teachers

Step 1: Development of E learning Content:
The researchers developed e-learning materials on selected topicschosen   from the Biology Teaching course outline:
- Preparation of Digital Lesson Plans;
- Teaching of Biology through role play method;
- The CAM (Concept Attainment Model) and ITM (Inquiry Training Model) for teaching Biology;
- Biology laboratories;
- Biology excursion (E-field trip);
- Nature and importance of Biology;
- Herbarium, Vivarium, and Aquarium.
The   forms of presentation included   Power Point presentations, videos, images, and text. Files were typically provided in HTML and PDF format.

Step 2: Upload developed learning materials on the Peppereducational site.
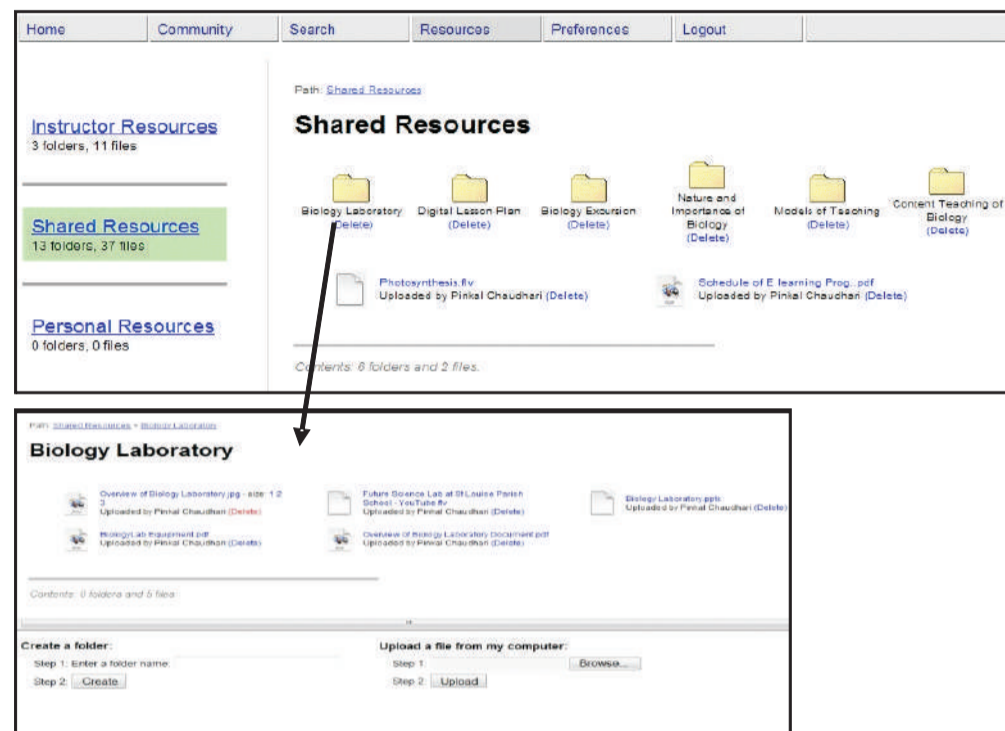
Figure 8: One of feature of PEPPER Shared Resources.
Materials were next uploaded onto Pepper and sorted into folders.

Phase 2: Development of pre-test and post-test tool:
To measure the growth of student knowledge over time, a test was constructed based upon content from each of the areas covered by the methods course.

Phase 3: Administration of the pre test:
The test was administered as at the beginning of the course to all students.

Phase 4: Implementation of E Learning Program:
As the course proceeded, students viewed thelearning materials and discussed the topic online at regular intervals at pre-scheduled dates and times. Discussion took placeusing instant messaging. In addition to instant messaging, student also interacted with the teacher and their peersduring face-to-faceclassroom meetings and using asynchronous messages.

Figure 9: Interaction among Students in PEPPER

Students also used the DVD to view the learning materialsat times that were convenient to them. Practical activities were given to the student to complete for their face-to-face classes, which took place the day after they werediscussed in their online classes.

Phase 5: Administration of post test:

After the completion of the intervention, the test was re-administered as a post-test to all students to assess change in achievement levels.

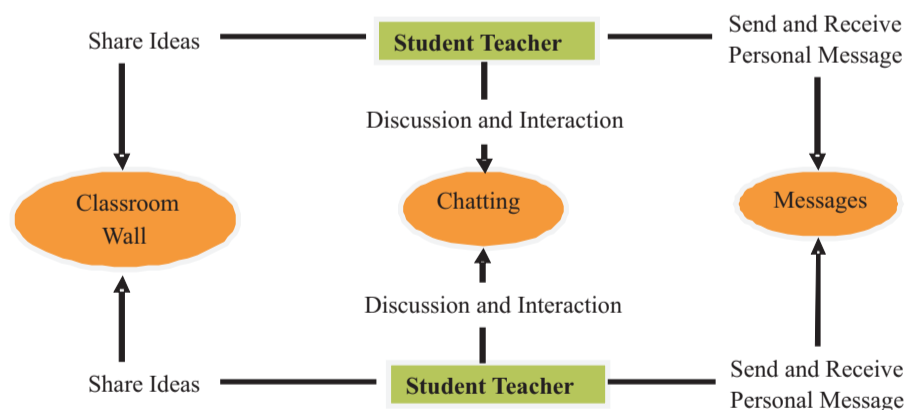**Phase 6: Administration of Opinionnaire:**

An Opinionnaire was distributed to collect student teacher views and experiences of the e-learning process. The Opinionnaire was designed to elicit student opinions regarding the effectivenessof thee-learning program as a whole.

DATA ANALYSIS:

Data collected through pre-test and post-test was analyzed by employing a paired t-test comparison. Data collected through the Opinionnaire was analyzed by percentage and frequency.
Data analysis and interpretation of data collected throughAchievement test:
At the beginning of the research, the investigator formulated the following null hypothesis: "There will be no significant difference in the mean achievement scores of the pre-test and post-test of the student teachers of Teaching of Biology."

Table 2: Computed Mean Score of Pre-test and Post-test, Correlation Coefficiennt R12, SD, SEMd, Computed t Value and Table t Value, Df

	Mean	SD	SEM	R_{12}	SEM_d	t Value	Df	Tablev alue
Pre-test	20.13	2.96	0.764	0.44	0.734	12.16	14	2.98
Post-test	29.06	2.38	0.614					

SD= Standard Deviation
SEM= Standard Error of Mean Score
R12= Correlation Co efficiennt
SEMd= Standard Error Mean Difference between Pre-test Mean and Post-test Mean
Df= Degree of Freedom

The results from the analysis reveal that the mean student post-test scores were significantly higher than the pre-test scores. Accordingly, the null hypothesis is rejected. Hence, it can be concluded that there is significant difference in the mean achievement scores on the pre-test and post-test of the student teachers.This suggests that thee-learning program was effective in terms of improving the achievement levels of the Biology student teachers. However, it is not clear which combination of instructional factors produced the improvement. This may be due to various approaches and strategies adopted in the blended e-learning approach that was developed.

DATA ANALYSIS AND INTERPRETATION OF OPINIONNAIRE:

To capture theexperiences and opinions of student-teachers regarding the e-learning program, the investigator administered an Opinionnaire. The Opinionnaire consisted 18 statements exploring various aspects of e-learning, such as the Organization of Online and Offline mode and its Effectiveness, Usefulness E-learning Program, and Opinions about Pepper. Students were expected to respond to each statement by either Agreeing, Disagreeing, or indicating that they were Undecided. The analysis of statements used simple frequency counts and percentages.

Table 3: Opinion of Student teachers with regards to Organization of Online and Offline mode and its Effectiveness

Statement No.	Statement	Agree	Undecided	Disagree
1.	E learning was systematized in terms of Online and Offline Activities.	14 *93.34%*		1 *6.67%*
2	E-Learning Program was very helpful for solving queries online.	15 *100%*		
3.	E Learning was very helpful for online Discussion.	14 *93.34 %*	1 *6.67 %*	
4.	Online Discussion was helped in Generating new ideas.	11 *73.34 %*	2 *13.34%*	2 *13.34%*
18.	Online Discussion helps student teachers in Offline Class Activities.	11 *73.34 %*	4 *26.67%*	

(*Note: Number given in 12, Times New Roman is Indicate Frequency and Number given in Bold, Italic, Times New Roman is indicate Percentage.)

One cluster of questions focused on the complementary use of online and offline activities. These questions, considered collectively, revealed that the majority of student teachers (93.34%) agreed that the e-learning program was effectively designed in its use of Online and Offline Activities. Moreover, they agreed that online discussion was helpful for offline class activities. All student teachers also agreed that the e-learning program was helpful for solving queries online. The majority of Students (73.34 %) agreed that online discussion helped student teachers generate new ideas and it helped them in their offline activities as well.

Table 4: Opinion of Student teachers with regards to Usefulness of E-learning Program

Statement No.	Statement	Agree	Undecided	Disagree
16.	E-Learning helps Teacher trainees to solve problems while teaching Biology.	15 *100%*		
8.	Video, Text and Graphical Presentation of Content was Useful.	15 *100%*		
13.	E-learning Program helped in solving problems through Instant Messaging.	15 *100%*		
7.	E-Learning Program made us Task oriented.	8 *53.34 %*	4 *26.67%*	2 *13.34%*
6.	Learning through e learning mode was Time Consuming.	1 *6.57%*	6 *40.00%*	8 *53.34%*
12.	E-Learning Program helped in developing Project Collaboratively.	11 *73.34 %*	2 *13.34%*	1 *6.67%*
17.	E- learning was helpful to get timely suggestions and feedback instantly.	13 *86.67%*	2 *13.34%*	

(*Note: Number given in 12, Times New Roman is Indicate Frequency and Number given in Bold, Italic, Times New Roman is indicate Percentage.)

In a second cluster of questions, student teachers were asked to share their opinions regarding theusefulness of the e-learning program. It was found that all the student teachers agreed that video, text and graphical presentations of content was useful and it helped them solve problems of Biology through Instant Messaging. All the student teacher agreed that the e-learning program was helpful for solving queries online. Approximately 53% of the student teachers opined that online learning was not time consuming. The majority of the students (86.67%)felt that e- learning was a helpful way to get timely suggestions and feedback instantly and 73.34 % agreed that it helped them develop collaborative skills.

Table 5: Opinion of Student teachers with regards to Knowledge eCommons

Statement No.	Statement	Agree	Undecided	Disagree
10.	Knowledge eCommons 2.0 is a very effective tool for E Learning	12 *85.71 %*	2 *14.28%*	
11.	KeC 2.0 is helpful in development of all the aspects (Cognitive, Affective and Psychomotor)	9 *60.00 %*	5 *33.34 %*	1 *6.67 %*

 (*Note: Number given in 12, Times New Roman is Indicate Frequency and Number given in Bold, Italic, Times New Roman is indicate Percentage.)

Statementsnumber 10 and 11 covered aspects of Pepper. When asked to share their opinions about Pepper, themajority of student teachers (85.71 %) indicated that it was a very useful tool fore-learning and 60% of the students agreed that it helped all aspects of development (Cognitive, Affective and Psychomotor).

Table 6: Opinion of Student teachers with regards to integration of E-learning with Teacher Education and Biology

Statement No.	Statement	Agree	Undecided	Disagree
14.	E Learning program is helpful to achieve objectives of Biology	11 *73.34 %*	4 *26.67%*	
5.	E learning material developed in Biology Methodology was very Comprehensive.	13 *86.67%*	1 *6.67%*	1 *6.67%*
15.	E-Learning Programs helps teacher trainees to understand to Effective Teaching Learning Process.	12 *85.71 %*	2 *14.28%*	
9.	Online Learning is better than Traditional Teacher centred Teaching Learning process	8 *53.34 %*	5 *33.34 %*	2 *13.34 %*

(*Note: Number given in 12, Times New Roman is Indicate Frequency and Number given in Bold, Italic, Times New Roman is indicate Percentage.)

The final cluster of questions examined the integration of e-learning with teacher education and Biology. The majority of student teachers (85.71 %) agreed that E-Learning programs helped them better understand effective teaching and learning processes. Similarly, 86.67 % agreed that the developed e-materialswere comprehensive and 73.34 % felt that the e-learning program was helpful for achieving the

course objectives in Biology. When the Investigator asked to them to compare online learning to traditional teacher-centred learning, 53.34 % agreed that online learning was better, and 33.34% remained undecided.

MAJOR FINDINGS:

The study's major findings can be summarized as follows:

· The null hypothesis of present study ("There will be no significant difference in the mean achievement scores of the pre-test and post-test of the student teachers of Teaching of Biology") is rejected.Hence, it can be said that there is significant difference in the mean achievement scores on the pre-test and post-test of the student teachers in the Biology teaching course.
· The majority of student teachers (93.34%) felt that the e-learning program was systematic in terms of it's use of online and offline activities and it wasuseful for solving queries online through discussion. Online discussion also helped them in offline class activities. The e-learning program helped student teachersbetter understand the key concepts in the course. It also promoted collaborative activity and helped students develop communicationskills.
· The majority of student teachers (85.71 %) felt that Pepper was an effective tool for e-learning and 60% of student teachers felt that Pepper helped them build knowledge, improve their understanding, and more deeply consider its application. Slightly over half (53%)of the student teachers opined that online learning was better than traditional teacher-centered instruction. The majority of student teachers (93.34 %) felt that e-learning was helpful for solving queries
· Finally, students felt that learning materials developed for the Biology methods course was comprehensive. In particular, the use ofvideo, text and graphics to presentcontent was effective. It helped them achieve the objectives of the Biology course, and solve the kinds of problems they would encounter while teaching Biology.

CONCLUSION:

As an on-line course designer, one must consider e-course objectives, the e-content, the e-policies and e-procedures, the e-evaluation of the course and how to deal with e-problems, which will arise during the on-line course. Beyond these challenges, the instructor must also take into account the emotional, psychological, and learning style of the perspective on-line student. The goal of the course designer is to created a finely-tuned course that engages people through social activities that motivate and draws effectively on the learners' background knowledge. Crafting such a course can be challenging; however, e-learning technologies offer exceptional opportunities for providing learners with rich and educationally powerful learning experiences.

REFERECES:

Bajcetic, M., Zugic, J., Stergioulas, L., &Bosic, M. (2007). Development of University professors eLearning skills Introduction to eLearning and LMS - Blended Course. In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.
Baric, K., Santrac, P. &Kukaras, D. (2007). Implementation of eLearning at the Facultyof Civil Engineering Subotica, Serbia- Should the creators of long distance learning courses become aware of didactics guidelines for advanced training? In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.
Bures, E., Abrami, P. C., & Amundsen, C. (2000).Student motivation to learn via computer conferencing.Research in Higher Education, 41(5), 593-621.
Codala, R. (2011). RADWIN Brings Internet & e-Learning to Rural India. Retrieved, August 18,   2011, from, www.pitango.com /upload /news/Sonet.pdf
Craig, D. V. (2001). View from an electronic learning environment: Perceptions and patters among students in an online graduate education course. Journal of EducationalTechnology Systems, 30(2), 197-219.
Cuneo, C. J., & Harnish, D. (2002).The lost generation in e-learning: Deep and surface approaches to online learning. Retrieved onApril 2, 2002.from   www.eric.ed.gov /ERICWebPortal/recordDetail?accno=ED466646
Dalal, P. (2006).E-Learning in India.Retrieved, Sept 16, 2006, from http://cyberlawindia.blogspot.com.
Diwakar, S., Achuthan, K., Nedungadi, P., & Nair, B. (2011).Enhanced Facilitation of Biotechnology Education in Developing Nations via Virtual Labs: Analysis, Implementati- on and Case-studies.International Journal of Computer Theory and Engineering, 3(1), 1793-8201.
Fee, K. (2010).Delivering E Learning.Delhi: Korgan Page India.
Fomsi, E. F., & Njoku, C. (2011). Undergraduate students Readiness for the use of Online chat for collaborative learning. TechnoLEARN, 1(1), 1-11.

Hedberg, J. G. & Ping, L. C. (2004).Charting Trends for E-Learning in Asian Schools. Distance Education. 25(2), 199-213.

Hewitt, J. (2010).Knowledge e Commons 2.0.Retrieved, April, 8, 2010, from http://innovatio ns. oise.utoronto.ca/edtech/index.php/Knowledge_eCommons_2.0.

Hrastinski, S. (2008).A study of asynchronous and synchronous e-learning methods discovered that each supports different purposes. EDUCAUSE Quarterly, 31, 4.

Kaufman, D. (1989) 'Third generation course design in distance education.' In R. Sweet (Ed.), Post-secondary distance education in Canada: Policies, practices and priorities (51-73).Athabasca: Athabasca University/Canadian Society for Studies in Education.

Khirwadkar, A., and Pushpanadham, K. (2010). Methodology: Perspectives on the Instructional Design for Virtual Classrooms. New Delhi: Sarup Book Publishers Pvt. Ltd.

Kim, K. & Bonk, C. J.(2006).The Future of Online Teaching and Learning in Higher Education.Educause quarterly,4, 22-30.

Kushwah, S. S., and Vijayakumar, J. K. (2011).Content creation and E-learning in Indian languages: a model.Retrieved, June 20, 2011, from www.cdac.in/html/pdf/session3 6.pdf.

Lazarevic, B. (2007). eLearning and online course development - Andragogy of Communication and Media. In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.

Mandic, V., Stefanovic, M., Zivic, F., Plancak, M. &Janjic, M. (2007).Development Of Metal FormingElectronic Instructional Resources. In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.

Milisavljevic, S., Vulovic, D., &Milivojevic, N. (2007).Thoracic Surgery eLearning course.In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.

Mukherjee, D. (2008). E Learning a Potential Learning Solution for Rural India-A Critical Analysis.Conference on Marketing to Rural Consumers.Retrieved, Apr 5, 2008, from http://hdl.handle.net/2259/425.

Naidu, S. (2006). E-Learning: A Guidebook of Principles, Procedures and Practices.Retrieved, July 21, 2008, from http://www.tonybates.ca/2008/07/21/e-learning-a-guidebook-of-principles-procedures-and-practices/.

National Curriculum Framework for Teacher Education. (2009). National Curriculum Framework for Teacher Education: Towards Preparing Professional and Humane Teacher. Delhi: NCTE.

National Knowledge Commission. (2009). National Knowledge Commission Report to the Nation 2006 – 2009. New Delhi: New Concept Information Systems Pvt. Ltd.

Pingle, S. S. (2011). Higher Education Students Readiness for E-Learning.TechnoLEARN, 1(1), 155-165.

Rossiter, J. (2002). An e-learning vision: Towards a Pan-Canadian strategy and action plan. (CANARIE Discussion paper). Ottawa, ON: CANARIE Inc. Retrieved August 15, 2005,from http://www.canarie.ca/funding/elearning/elearningvision.pdf.

Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006).The Impact of E-Learning in Medical Education.Academic Medicine, 81(3), 207-212.

Sahay, M. (2009).E-Learning for Indian Higher Education: The "Complete Solution" Approach. Retrieved, Jan 22, 2009, from www.ten.us.com/resources/CSICP.pdf.

Sanderson, P. E. (2002). Book review E-Learning: strategies for delivering knowledge in the digital age. Internet and Higher Education, 5, 185–188.

Schnackenberg, H. L., Luik, K., Nisan, Y. C., & Servant, C. (2001).A case study of needs assessment in teacher in-service development.Educational Research and Evaluation: AnInternational Journal on Theory and Practice, 7(2-3), 137-160.

Singh, P. P., & Sharma, S. (2005). E Learning: New Trends and innovations. New Delhi: Deep & Deep Publications Pvt. Ltd.

Stefanovic, K. (2007). Laboratory Experimental Setups for Measurement and Control via Internet.In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.

Trentin, G. (1997) Telematics and on-line teacher training: the POLARIS project. Journal of Computer Assisted Learning, 13, 261-270.

United Nations Educational, Scientific and Cultural Organization.(2011). UNESCO ICT Competency Framework for Teachers.UNESCO.

United Nations. (2011). The Millennium Development Goals Report.Newyork, UN.

Zivkovic, Z., Pavlovic, N., and Milosevic, M. (2007).E Learning of Engineering Graphics.In D. Scepanovic (2007).eLearning Toward Effective Education and Training in the Information Society, Proceedings of the eLearning Conference: Belgrade, Wus Austria.

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