

National e-Learning Centre (NeLC) Project

Progress Report – Year Three

Period 1st January 2009 – 31st December 2009

Submitted by



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Executive Summary

This report presents the status and progress of NeLC (National e-Learning Centre Project) after the end of the 3rd Year of the Project. Due to several practical problems, the first two years of the project could not be aligned with calendar years. However, the third year of the project was aligned to the Year 2009 and it was able to streamline project activities.

According to the initial contract, it was supposed to conduct an independent review of the project to determine the further extension of the project to its fourth year. At the time of writing this report, such independent evaluation has been carried out and the UCSC received positive responses from Swedish International Development Agency (Sida) with regard to the continuation of the project for the fourth year. However, due to logistic issues, it was decided that the fourth year of the project will be limited to the first eight month of the year 2010.

This report highlights the achievements during the year 2009 (3rd Year) of NeLC Project. These achievements are presented based on five (5) outputs planned in the logical framework of the project. At the end of report, the present values of Project Indicators are given to show the progress of Project activities.

Section 1: Logical Framework (LF – Ver 2.0)

Initial logical framework of the project was revised after the first year based on the experience gained and it was further examined and adopted during the third year independent review of the project.

	Intervention logic	Objectively verifiable indicators	Source & means of verification	Assumptions
Long Term Objective	For the development and poverty elimination in Sri Lanka, all sectors of education (HE, SE, CE and PE) are enhanced through proper integration of ICT based services.	Number of recipients who have received e-Learning based services in different sectors Number of people who have received specialized training in e-Learning	Reports from MOE, UGC, ICTA and other government agencies UCSC Administration records Survey results of the project Project progress report	Economic and political stability in the country Affordable internet access tariffs Retention of qualified researchers Recognition of ICT integration in the education process by MOE and other government agencies.
Specific Objective / Project Purpose	Design, Develop and Publish more effective, efficient, scalable and economical e-Learning Framework which can be used in HE, SE, CE and PE.	Number of resources available in this framework Number of students enrolled in the online program and their satisfaction. Number of people who have received specialized training Number of e-Learning courses available for different sectors	Project records and progress reports UCSC Administration records LMS and other systems log files	Timely Funding Less administration overhead and constraints from external parties Cooperation from other organizations who directly involve in other organizations UCSC and Project staff support to achieve objectives
Expected Results	1. Postgraduate and Research Programs to develop human capacity in e-Learning. 2. Methodologies, systems and resources including specialized training programs which can be used to create e-Learning courses and services.	1.I1 Number of R&D Projects 1.I2 Number of postgraduate programs 1.I3 Number of workshops conducted 1.I4 Number of students enrolled in the postgraduate program 1.I5 Number of publications wrt e-Learning 2.I1 Number of outputs which can be used to develop services and/or to solve problems	Project Records Project Progress Reports Employment Records of NeLC. Annual report of the UCSC. Attendance lists maintained by the NeLC. UCSC student registration records Research papers, publications	Fault tolerance of network and internet, Retention of project staff Falling costs of telecommunications and internet access Availability of access points throughout the country Industry acceptance of certified e-Learning courses

	<p>3. Different e-learning courses for different certification.</p> <p>4. An online degree program for the ICT capacity development in developing countries as a model</p> <p>5. A National Centre of excellence in e-Learning, which will provide consultations and services to promote e-learning in Sri Lanka and other Asian/developing countries.</p>	<p>2.I2 Number of training programs conducted</p> <p>2.I3 Number of internal staff trained</p> <p>2.I4 Number of external staff trained</p> <p>3.I1 Number of e-Learning Courses developed</p> <p>3.I2 Evaluation results of e-Learning courses developed</p> <p>3.I3 Number of students enrolled and successfully completed</p> <p>3.I4 Number of collaboration with external organizations and their level of satisfaction</p> <p>4.I1 Percentage of development of online degree program</p> <p>4.I2 Number of students enrolled in this program</p> <p>4.I3 Student satisfaction about services in the online degree program</p> <p>4.I4 Student performance in the degree program</p> <p>4.I5 Independent evaluation of the degree program</p> <p>5.I1 The number of different services NeLC can provide.</p> <p>5.I2 The number of trained staff at the e-Learning Centre.</p> <p>5.I3 Number of assignments/services provided to the external parties.</p> <p>5.I4 Number of external organizations which have received assistance from the NeLC.</p>	<p>presented.</p> <p>NeLC Staff Profile and UCSC Register.</p> <p>Survey conducted by the project</p> <p>Log reports of LMS and other systems</p>	<p>Availability of the participants released from their respective organizations.</p> <p>Recognition of e-Learning as a potential research area by University Faculty.</p> <p>Cultural acceptance of e-Learning</p> <p>Affordability for the cost of e-Learning courses</p> <p>Productive cooperation and collaboration of all stakeholders</p>
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Progress and Status of Project Outputs:

In this section of the report, the status and achievements of the project are presented, which are based on the main output described in the logical framework.

1. Postgraduate and Research Programs to develop human capacity in e-Learning

Since NeLC project deals with (four) sectors of the education (Higher Education (HE), School Education (SE), Community Education (CE) and Professional Education (PE) [including specialized training], during the third year more emphasis was given to identify e-Learning applications, methodologies and services in Higher Education, the Secondary Education and Professional Education sectors.

The development of human capacity is an important foundation to achieve the project objectives as well as to maintain the sustainability of e-Learning culture in all sectors of education. Some activities started in the second year of the project were continued during the third year, and some new activities were also initiated in the third year to further strengthen the output in this category, which are summarized below.

1.A1 Collaborative Split-PhD Program in e-Learning with Swedish Universities

Two candidates who started the split-phd program at the beginning of NeLC project were continuing their studies while demonstrating their capability and contributing to e-Learning research and development. In the third year, both candidates had international publications and presentations. At the same time, Ms. Thushani Weerasinghe completed her Licentiate level of her phd program at Stockholm University. Detail progress of these two candidates and list of their publications are given in the Appendix 1 of this report. Ms T A Weerasinghe continues to read for her PhD Programme at the University of Stockholm in “Critical Analysis of e-Learning Behaviors in e-Learning environment” and Mr. T M H A Usoof continues his PhD in “Unsupervised e-Assessment” at the University of Umea.

Mr. Hiran Ekkanayake, a probationary lecturer of UCSC, completed his mphil in e-Learning during January 2009. The PMC (Project Management Committee) of NeLC Project and visiting researchers from Sweden were very happy and satisfied about his achievements and decided to give an opportunity to visit Sweden for a study tour during 2009. One objective of this visit was to give him chance to find out ways to extend his studies in e-Learning with the help of Swedish Universities and resource personnel.

He made a request for a split phd program in e-Learning at the Sweden Universities. His co-supervisors were from Stockholm University and Skövde University and the title was “Automation of Learner Performance Detection and Mental Guidance in Affective Game-based Learning”. (A copy of his proposal is attached to appendix 1) PMC together with SPIDER coordinator decided to support this study since it will definitely contribute the e-Learning development and will further enhance research and development cooperation between those Swedish universities and UCSC. Since his project may not be able to finish before the end of NeLC Project, it was decided to pay the full cost of the study as one time payment. However, respective organizations SPIDER and UCSC agreed to monitor the

progress and guide the candidate to successfully complete his studies. Progress report of this Mr. Hiran Ekkanyake is also attached in the appendix 1 (1.A1).

1.A2 Development of the Virtual Environment for the collaboration in the Split-phd and other postgraduate programs

Promoting e-Learning in postgraduate study programs, it was decided to continue the motto “*e-Learning for e-Learning*” as much as possible. However, due to number of students the programs have gone up, a decision was taken to set up a separate server for this environment. Hence, a revised improved virtual learning environment for postgraduate studies is now <http://pglms.ucsc.cmb.ac.lk> (earlier address for a shared server was <http://lms.ucsc.cmb.ac.lk/pg>)

Postgraduate VLE environment is now used to provide master courses for postgraduate studies and currently it has more than 400 students. This environment is used to deliver blended courses of MIT(e-Learning) stream and other postgraduate courses of UCSC. Postgraduate projects in e-Learning are also hosted in this LMS.

1.A3 Mini-split Phd/Mphil programs in e-Learning

This is one of key activities planned to carry out in the e-learning project. Compared to split phd program approach in this one, UCSC undertakes more responsibility on the research study of each candidate and the Swedish academic members play the role of resource persons/facilitators in carrying out the study. Two fulltime students and two part time students who started their studies during the second year of the project, continued their studies. Two more new students started their e-Learning mphil under this program. During 2009, two of these mphil students spent 8 weeks in Sweden and their respective supervisors visited for one week during this stay in Sweden. We were able to develop an effective collaboration among all these parties. Progress reports of these students are given in the Appendix 1 (1.A3). Progress of these students is satisfactory according to relevant supervisors.

Candidate	Title	Status	Comment
P.K.M. Thilakarathna	HOW TO IMPROVE THE EFFECTIVENESS OF PEER GROUP LEARNING ? An information technology based approach to build a collaborative peer group learning framework on top of an ad-hoc network	Full Time - Two Years Completed,	6 months extension was given to complete. Progress report attached Appendix 1 (1.A3). Supervisors satisfied.
R.V.S.P.K. Ranatunga	On-line Plagiarism Detection in e-Learning Systems	Full time, one year completed	Very good progress, had a good presentation at e-Asia 2009. Progress report

			attached (1.A3) and supervisors satisfied.
Enadi Chathuri Upeksha Gunathunga	Study on applicability if e-Learning in the secondary education sector in Sri Lanka	Part Time. Second Year.	Still no publications and supervisors are not satisfied with the progress.
S.M.Madhavie Malika	Study the Role of the Digital Library in Online Learning	Second Year	Still no publications and supervisors are not satisfied with the progress.
K D Sandaruwan	Computer based ship model to predict real-time ship motion characteristics for perception enhanced virtual environment	Part Time - Second Year	5 Papers Accepted. Very Good Progress and Supervisors are satisfied.
M.A.Kaleelur Rahuman	Study of Informal Learning	Full Time, Year one	2 Poster Papers accepted at e-Asia 2009. Supervisors are satisfied.

1.A4 Commencement of the Masters Program in e-Learning

The first batch of Master of Information Technology (MIT) in e-Learning program was successfully completed during third year of NeLC Project. This one of major achievements in this project. MIT (e-Learning) is the only postgraduate degree program in Sri Lanka.

Prof. Lani Gunawardana from the University of New Mexico ,USA was the key resource person who facilitated the development of the course as well as was to deliver it to the first batch of the program. At the same time , UCSC staff members were directly involved in developing and delivering the course. A blended learning model in which 80% of the evaluation was based on the online activities and assessment, was applied in delivering the program. The delivery of this master course is a kind of new course for teaching staff to redesign other courses in the program. Two courses that were completed during the Year 3 (2009) are “Evolving Technologies in e-Learning” and “Planning, Managing, and Evaluating e-Learning”. Online version of these courses are available at <http://pglms.ucsc.cmb.ac.lk> [Semester 4: MIT4070 and MIT4080]



MIT (e-Learning) Group with Prof. Lani Gunawardana

In addition to introducing MIT (e-Learning) sub-stream, e-Learning related subjects have been introduced in the Master of Computer Science (MCS) program and e-Learning related projects will be promoted in both Masters program. “e-Learning Concepts and Technologies” is the course introduced to Mater of Computer Science program and it was also conducted in the blended learning mode in which 80% of assessment was based on online participation. Online course is available in the <http://pglms.ucsc.cmb.ac.lk> [Semester 4: MCS4020]

Several students have started e-Learning based research projects in the master program as their individual projects. 8 such projects were completed them successfully during 2009. Two of these students were able to present papers at e-Asia 2009 Conference. Details about these projects and papers can be found at online version of digital learning track of e-Asia 2009, <http://www.e-learning.lk/vle>. Abstracts of these two projects are given in the Appendix 1 (Section 1.A4)

The most important aspect of these online activities are their sustainability. MIT (e-Learning) program's second batch has commenced their studies in 2009 December. Without the support of NeLC project, UCSC is now capable to maintain and continue this postgraduate study program.

1.A5 Enrollment of the masters program in e-Learning at the university of Edinburg

In the evaluation of the postgraduate programs in e-Learning, the Master Program in e-Learning (MSc in e-Learning) [<http://www.education.ed.ac.uk/e-learning/>] was identified as one of the best International programs. It is fully delivered through online e-Learning framework and NeLC PMC decided to fund one candidate who is a full time project participant. A suitable candidate (Miss Nishakumari) was selected and she was able to obtain the placement in this program.

Miss. Nisha Kumari has now completed all her courses including the final project. Based on her masters project, she presented a paper at the e-Asia 2009 conference. A copy of her abstract is given in the Appendix 1 (1.A5). Miss Nisha is an active staff member of e-Learning Centre and she contributes to the development of e-Learning courses as the team leader. At the same time, she is also An assistant Lecturer for the MIT (e-Learning) stream. Her experience gained through MSc (e-Learning) program at Edinburg University was helpful to achieve objectives of this course.

1.A6 Support to students for e-learning related studies

It is also important to mention that subjects related to e-Learning was introduced to undergraduate program (3rd and 4th Years of Bachelor of Information Communication Technology) in order to increase the knowledge and awareness in e-Learning. At the same time, 3rd year students of undergraduate programs were given the opportunity to work as interns at the e-Learning Centre to obtain understanding and to participate in Research and Development work in e-Learning.

28 students completed the course on "e-Learning and Instructional Design Methodology" during first semester of the academic year 2009. 14 students were given placement opportunities in the NeLC project. These students contributed to the development of e-Learning Systems as well as development of online courses. Development of m-Learning module and Curriki Repository are two such important achievements. Two posters based on these studies were presented at e-Asia 2009 conference held in December 2009. Appendix 1 (A6) shows those two abstracts and photos of posters presented based on these projects in the next section of this report.

During 2009, two staff members joined the Master of Computer Science Program of UCSC and they were supposed to engage in e-Learning related projects. At the same time, students who were sponsored to follow MCS/MIT programs were conducting research in e-learning. 6 Staff members have so far been sponsored to follow masters program under this scheme.

1.A7 Initiate Research and Development Projects in e-Learning

Research and development activities are further conducted with respect to following subject areas during the third year of the project. It was possible to publish large number of research papers and the NeLC projects received 3 National level awards for this contribution to the nation. More details about these awards are given in the section 5.

Online Virtual Campus (<http://vle.bit.lk>)

1. Virtual Learning Environment (VLE) in e-Learning
“Vidu Piyasa” [Knowledge Interface for Learning] is the model virtual campus built based on UCSC e-Learning infrastructure. UCSC demonstrated this activity among other universities to promote e-Learning. At the same time, NeLC Project received e-Swabhmani Award for this Virtual Campus project in November 2009.
2. Modules development in Moodle (<http://dev.lms.bit.lk/moodle>)
3. e-Learning Localization (select Sinhala/English/Tamil from <http://vle.bit.lk>)
4. m-Learning @ UCSC (<http://vle.bit.lk/m>)
5. Digital Library and e-Learning integration (<http://192.248.16.114:8080/dspace/>)
6. Blended Learning – Learning Activity Mapping
(<http://dev.lms.bit.lk/moodle/mod/resource/view.php?id=4885>)
7. V-Learning (voiced based learning) to facilitate mobile learning
8. e-Learning Repository (<http://www.e-learning.lk/enosha>)

e-Assessment System (<http://www.e-learning.lk/eassess>)

9. Online e-testing system was further developed to carry out e-Testing activities.
10. Skill Assessment for online evaluation (<http://www.e-learning.lk/drupal/sites/default/files/OSAS.pdf>)
11. Assessment Objects for e-Learning (<http://www.e-learning.lk>)

Development of Interactive online Material

12. Identified methodology for e-Learning Course Development was further enhanced (<http://dev.lms.bit.lk>).
13. Audio-visual material to support online learning and podcasting – UCSC TV Project (<http://www.ucsc.tv>)
14. Identify the requirements of Quality Development and Assurance in e-Learning courses (<http://dev.lms.bit.lk>)
15. Maritime Learning Project (Please check Annex1 sub-report)

1.A8 Disseminate knowledge and International Paper presentations

Based on the research and development activities in e-learning funded from NeLC, more than 20 papers were published during the year 2009. A list of papers presented is given below. It is important to note that many of these publications are peer-reviewed publications.

Papers Published during 2009 (NeLC Third Year – 24 International Publications)

1. Real-time Ship Motion Prediction System- Computer Games, Multimedia and Allied Technology 09 conference in Singapore ISBN: 978-981-08-3165-3
2. Virtual learning and training environment for marine education (2009)27th National Information Technology Conference in Sri Lanka ISBN: 978-955-9155-17-1
3. Modeling and Simulation of Environmental Disturbances for Real-time Six Degrees of freedom Ocean Surface Vehicle- Sri Lankan Journal of Physics (Accepted)
4. Perception Enhanced Virtual Environment for Maritime Applications - Computer Games, Multimedia and Allied Technology 10 conference in Singapore (Accepted)
5. Improving student learning through assessment for learning using social media and e-Learning 2.0 on a distance education degree programme in Sri Lanka, *Hakim Usoof & Gihan Wickramanayake*, ECER 2009, Vienna
6. Studying writing profiles with keystroke dynamics using fuzzy logic and statistics, *Hakim Usoof, Eva Lindgren, Roshan Yapa & Nishantha Karunaratne*, EARLI 2009, Amsterdam
7. Design of an Online Learning Environment for Distance Learning, Thushani A. Weerasinghe, R. Romberg, K. P. Hewgamage, International Journal of Instructional Technology and Distance Learning, vol.6, no. 3. March 2009
8. Guidelines to Design Successful Online Learning Environments - Thushani A. Weerasinghe (e-Asia 2009)
9. A Ship Simulation System for Maritime Education - Damitha Sandaruwan (e-Asia 2009)
10. Effective strategies to motivate students in online discussion forums - K M G B Nishakumari (e-Asia 2009)
11. SCHOOLNET: Impact on Learning and Teaching - Withanage Chaminda Priyashantha (e-Asia 2009)
12. Deploying and Managing TechnoSocial Network for OLPC - P D Ariyadewa (e-Asia 2009)
13. An Integrated Framework for Detecting Plagiarism in eLearning Systems - R V S P K Ranatunga (e-Asia 2009)
14. SCORM Based Online Assessment Objects for Computing Skill Evaluation - Enosha Hettiarachchi (e-Asia 2009)
15. eNOSHA - Design and Development of a Learning Object Repository - Peter Mozelius (e-Asia 2009)
16. A Study of Informal Learning in ICT Enabled Environment - M A Kaleelur Rahuman (e-Asia 2009)
17. A Constructivist Approach to Learning English Online - P.A.S.P. Jayalath (e-Asia 2009)
18. mLearning @ UCSC: Extending the elearning framework based on the mobility - W.M.A.S.B. Wickramasinghe (e-Asia 2009)
19. Pedagogy Changes for ICT Enabled Primary Education in Sri Lanka - M A Kaleelur Rahuman (e-Asia 2009)
20. Collaborative Digital Learning Repository for Secondary Education - P.K.A.T. Ishaka (e-Asia 2009)
21. Reusable Composite SCORM e-Learning Objects - Gangani Chandima Siriwardana (e-Asia 2009)
22. Online Approach to Improve Basic Tamil Language Skills - M. Dewasurendra (e-Asia 2009)
23. "V-Learning: Using voice for Distant Learning in Emerging Regions" Thushari Atapattu, Kasun De Zoysa. in the proceedings of the International conference on Computer Supported Education, Lisboa, Portugal. March 2009
24. Accessing the University Learning Management System through voice communication, Thushari Atapattu, Sashikantha Wanasinghe, Kasun De Zoysa, Lakshman Jayaratne, 27th National Information Technology Conference in Sri Lanka.

1.A9 Visiting Researcher Program in e-Learning

The main objective of this program is to facilitate a senior staff member to carry out research and development work in e-Learning. Dr. Gihan Wickranayake was selected as the candidate for the second of the project and he spent 5 months at the Umea university in Sweden and another 4 months at the Computer Science Department, Stockholm University. His stay at the Swedish universities allowed us to enhance NeLC project activities and establish more collaboration with Swedish researchers in this area. During his stay, he attended several research conferences, participate in several study visits, followed online courses and participated in several research work. In 2009, Dr. Gihan Wickramanayake spent 3 months at the New Mexico University in USA as a visiting researcher. His stay at the New Mexico allowed him to develop the “e-Learning Technologies Course”.

Dr. Damitha Karunaratna is the next member of the Senior Academic Staff who was to visit Sweden during the third year (2009) of NeLC Project. However, due to his personal commitments, he requested that his visiting researcher program be rescheduled. At the time of writing this proposal, his application to visit Stockholm University for a period of 6 months starting from late February 2010 to August 2010 has been approved by the PMC and he is in the process of making travel arrangements. SPIDER has confirmed his placement at the Department of Computer Science, Stockholm University.

2. Methodologies, systems and resources including specialized training programs which can be used to create e-Learning courses and services.

Based on the project activities, expertise has been built to develop methodologies, systems and resources which can be used to enhance e-Learning infrastructure so that e-learning services could be provided and e-Learning could be promoted in developing countries. This knowledge is distributed through research publications as well as special workshops, specialized courses and seminars, exhibitions and presentations at other universities. During the Year 3 of the project, the most important event was the conference in e-Learning. This conference is used to showcase achievements of NeLC project as well as to disseminate resources built during first three of the project.

2.A1 UCSC.tv [Vidu Dahara] – Framework to webcast audio visual materials

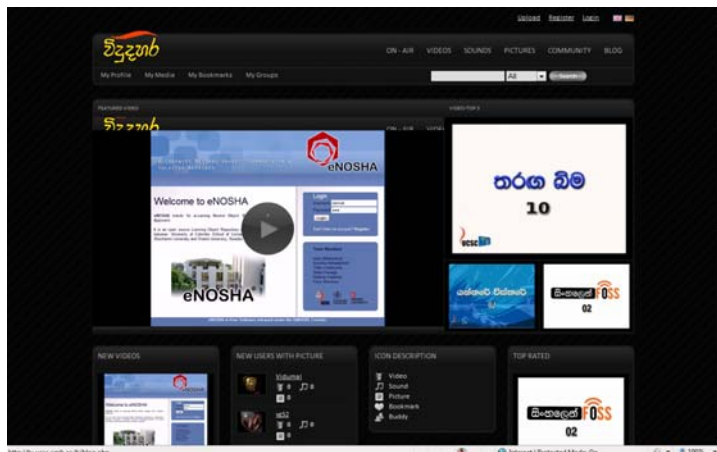
This frame work was developed based on the open source resources and it is hosted at the UCSC. Many audio visual materials which we develop as supplementary materials cannot be uploaded into LMS/VLE environment, since it creates server overload. Sometimes, we are using Google service “YouTube” as a way to distribute this service. However, these are not sustainable materials and sometimes it is difficult to upload some materials due to technical (file sizes), copyrights or authors preferences to public domains like YouTube. During the last 10 years, large number of audio visual materials were developed at UCSC but they are not accessible in an online mode. As a result they have now become obsolete.. UCSC.tv framework was used to develop to deliver these materials.

At the same time, the development of soft skills of online learners is very important requirement. Mentoring, counseling and guiding them in the correct direction is very important. UCSC.tv framework is used to deliver such soft skill development materials developed with the help of various volunteer contributors. This online TV, called Vidu Dhara (Knowledge Flow) is available for anyone to access at <http://www.ucsc.tv> . Using the resources of this TV was launched with the help of many staff members of UCSC. Photos of this launch is available at

<http://tv.ucsc.cmb.ac.lk/media.php?type=photo&order=date&offset=16>



[Launch of UCSC.tv @ UCSC on 23rd May 2009](http://tv.ucsc.cmb.ac.lk/media.php?type=photo&order=date&offset=16)



<http://www.ucsc.tv> (starting page)

UCSC.tv [Vidudahara] has now become an integral part of Vidupiyasa (UCSC Virtual Campus) to promote audio visual education as well as to develop the soft skills of online learning community.

2.A2 Open Learning Object Repository

From the beginning of NeLC project, we started developing e-Learning objects for e-BIT online degree program, FIT online certification program and other online courses. These activities resulted a large repository of online learning materials together with so many assets to develop online courses. They have been developed by a team of instructional designers and content developers who works for the NeLC project. One of biggest issue was to share and reuse them rather than re-doing things again and again. We started evaluating several open source frameworks to address this issue together with our Swedish consultants from Stockholm and Oraburea University. Unfortunately, we were not being able to identify any good framework which we can be used to solve this common problem in e-Learning content development. At the same time, we identified this is as a common requirement of many e-Learning projects in the world.

Research and development team comprising members from UCSC, Stockholm University and Oraburea University. The project was initiated during early 2009, since this problem was identified during the second year of the project. Based on the research and development work, a working version of the product was completed before e-Asia 2009 conference. This open learning object repository was named as “eNOSHA” and the public version now currently available at <http://www.e-Learning.lk/enosha>. Details of the project is given at <http://www.e-learning.lk/drupal/?q=node/15>. Two research papers were presented at e-Asia 2009 conference based on this project and they are available at <http://www.e-learning.lk/vle> [e-Asia digital learning 2009]. A workshop was conducted for 20 visitors who attended e-Asia 2009. Publicity was given at e-Asia 2009 conference <http://picasaweb.google.com/nelcproject/EAsia2009#5412360405883515586>. Majority of these participants are from other educational institutes [<http://www.e-learning.lk/drupal/?q=node/19>]. More photos of this workshop is available at

<http://picasaweb.google.com/nelcproject/ENOSHAWorkshop#>



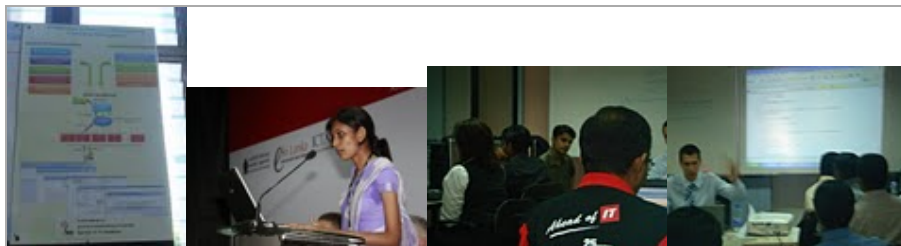
eNOSHA Workshop – 6th December 2009

2. A3 Office Skill Assessment

ICT Awareness is one of important consideration under the nelc project. This includes both online learning as well as evaluation for large scale evaluation for certification. MCQ based assessment is the commonly used approach for large scale evaluation and it was an accepted approach at e-Testing Lab of NeLC Project. After conducting evaluation for two years, we identified that MCQ is not a good approach to evaluate the skill of office applications. Two projects were started based on this requirement to identify a solution.

One project is based on the simulation approach and other one was based on the online skill assessment tool for automated marking of artifacts created using office applications. Both these two projects were successful and we were able to present papers at e-Asia 2009 conference and carry out a workshop based on office application skill assessment. Presented papers and posters are available at <http://www.e-learning.lk/vle> (Digital Learning 2009) and poster was also displayed at the conference (<http://picasaweb.google.com/nelcproject/EAsia2009#5412360973847987682>).

A workshop on office skill assessment systems conducted 5th December 2009 for selected participants of e-Asia conference. Online version of OSAS (Office Skill Assessment System - <http://www.e-learning.lk/drupal/?q=node/16>) which has now been integrated with Moodle LMS is available at <http://www.ictcr.org/osas/>. Workshop photos are at <http://picasaweb.google.com/nelcproject/OfficeSkillAssessmentWorkshop2009#>

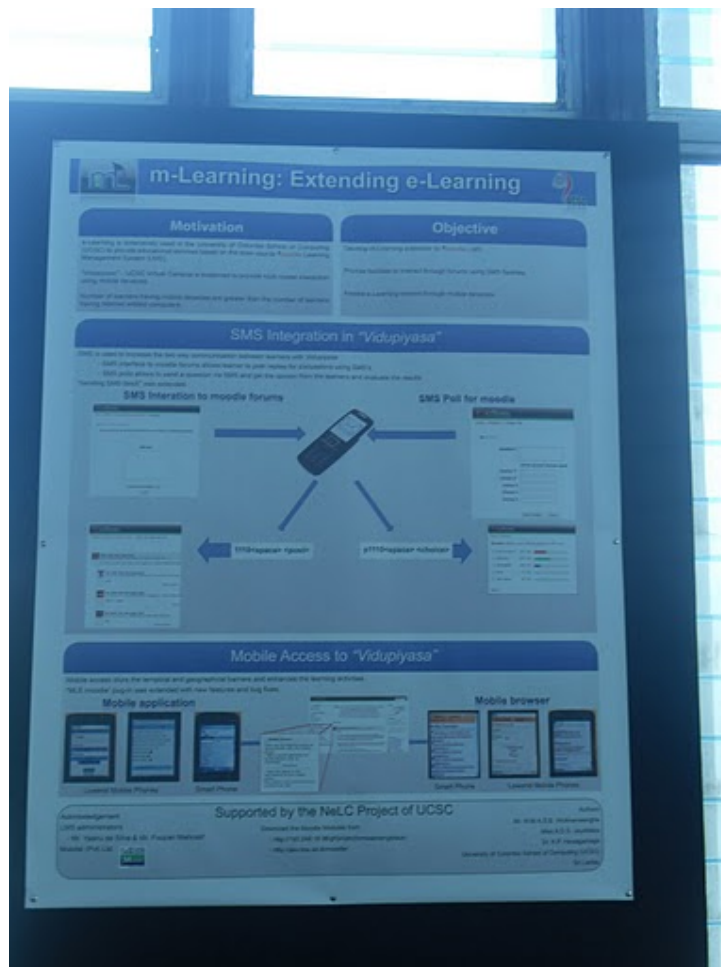


e-Asia Paper presentation of Simulation based Assessment & Workshop on the Office Skill Assessment System Workshop. Developed software was distributed among participants of workshop.

2. A4 Extending e-Learning Framework m-Learning and v-Learning

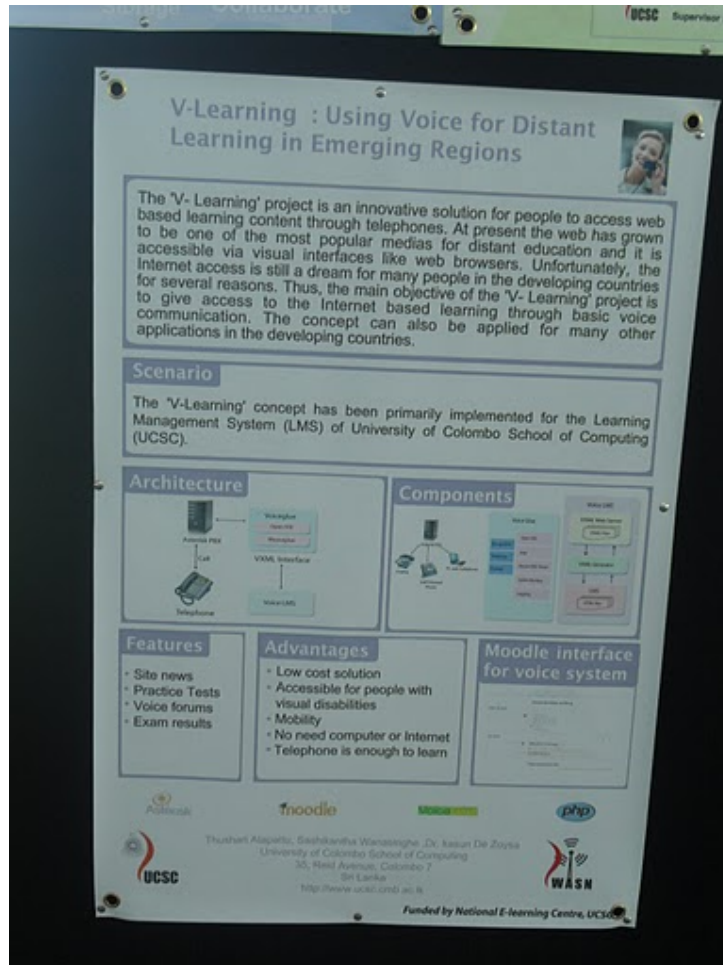
m-Learning is considered to be the next generation of online learning and NeLC started carrying out research and development work of nelc project during Year 3 of the project. We were able to develop new modules for Moodle based LMS to contribute as well as to extend our own e-Learning Framework, Vidupiyasa (UCSC Virtual Campus). As a result of this integration, all our Moodle based VLE environments are capable to interact with learners through SMS based system as well as are capable to view content through mobile devices like java enabled smart phones. Mobile browsing is enabled at <http://vle.bit.lk/m> . SMS based interaction is listed at <http://uglms.ucsc.cmb.ac.lk/mod/forum/discuss.php?d=572>

Based on these development, a paper was presented at e-Asia 2009 Conference (www.e-learning.lk/vle) and poster was displayed for the publicity. All these developments were released to public domain to contribute the e-Learning development worldwide. They can be downloaded at the development server (<http://dev.lms.bit.lk/moodle>) as well as at the Moodle site. We hope this module will be integrated as a common distribution module in Moodle 2.0 or above.



M-Learning Poster at e-Asia 2009

v-Learning Stands for voice based learning and this was another sub-project conducted by the NeLC Project. Several papers were presented based on this project and due publicity was given at the e-Asia 2009 conference for this project . Detail report of this sub-project is given in the Annex 2 (v-Learning) of this project.



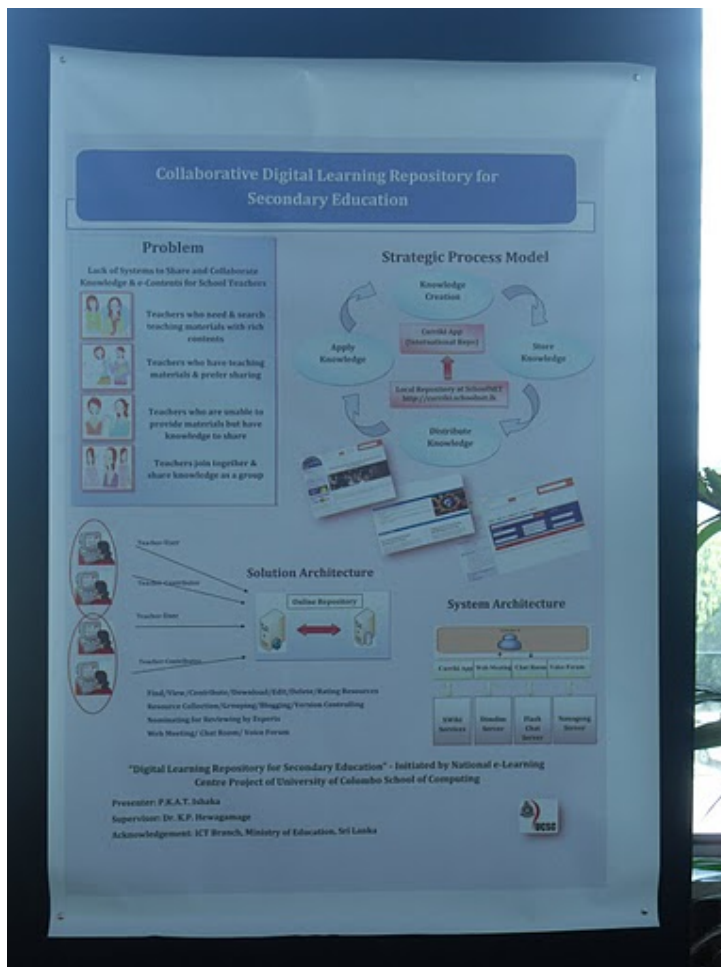
v-Learning Poster at e-Asia 2009 Exhibition

2. A5 Localized Curriculum Wiki (Curriki) for Secondary Education

NeLC Project was supposed to contribute significantly for the development of e-Learning integration with the secondary education. Ministry of education has already started some activities under their SEMP (Secondary Education Modernization Project). Rather than duplicating or doing unrelated things, PMC of NeLC project wanted to carry out activities that will further enhance what has already started. In the Year 1, NeLC Project localized Moodle LMS to Sinhala and Tamil and then it was possible to get this localization features on the schoolnet. In the Year 2, NeLC Project developed few online courses for schoolnet (<http://moodle.schoolnet.lk>) LMS and introduced how e-Learning content could be developed. At the same time, a core group nominated by the Ministry of Education was trained by NeLC project as train trainers. This group became an active group and they were

able to contribute other e-Content development. For example, they were able to contribute to the e-Content development of the OLPC promotion program. In the third year of the NeLC, one of the main contribution was to develop a repository to promote development. The Ministry of Education was interested to follow international repository (www.curriki.org) in a suitable manner. The NeLC Project agreed to support this initiative since it was also an open learning initiative. The Main task was to localize this curriki system allowing both Sinhala and Tamil teachers to use it and localize deployment of the system according to local curriculum. The NeLC Project carried out this Research and development work successfully and handed over the system to the Ministry of Education. A research paper based on this project was also accepted at e-Asia 2009 conference and it was also presented at same (www.e-learning.lk/vle). The poster photo is given below.

Ministry of Education also wanted to get a core group trained on the system and NeLC helped to do this. However, real deployment was failed to complete before end of Year 3 since schoolnet servers are maintained at third party and it was very difficulty to get things as we requested. At the time of writing, we are still trying to get this done at <http://curriki.schoolnet.lk>



2. A6 OLPC Localization and Promotion

OLPC is a worldwide known project and when it was launched in Sri Lanka, the Ministry of Education requested UCSC support to enhance using e-Learning framework developed using NeLC Project. First issue was localization of the OLPC XO operating system to both Sinhala and Tamil languages. With the help of many volunteers, we completed the task with the help of Ministry of Education. We also identified the research issues in order to promote ICT based education. School server based moodle LMS was proposed to synchronize parallel learning. At the same time, training and maintaining network of school teachers, resource persons, students and other stakeholders is the key for its sustainability. Pedagogy was also another key issue to promote OLPC concept, since curriculum and progress path are not clear. Based on the initial promotion of the work, a paper was published at e-Asia 2009 Conference (<http://www.e-learning.lk/vle>) and several workshops are conducted during October 2009. More work is being planned during 4th year of the project.

2. A7 Online Journal to promote e-Learning and ICT in Immerging Regions

This is another area where NeLC Project promoted together with collaboration with SPIDER to disseminate formal research and development finding. Online system as well as development of community (authors) were promoted by NeLC project. Online version of the Journal is available at <http://www.icter.org>

2. A8 Maritime Learning – Professional Development

Maritime Learning is a significant research and development project carried out in order to find out integration of professional skill development and online learning environment. This project was started as an mphil study but later it was considered as a sub-project of NeLC. The project was carried out in collaboration with the Sri Lanka Navy. At the same time, we have initiated the collaboration with Stockholm University, Computer Science department to further enhance this project.

Based on this project, several research papers have been presented at three International conferences in 2009. Those papers won the best paper presentation at the Annual National Conference of Computer Society of Sri Lanka. Later in the Year 2009, it won the National Award e-Swahabihimani for the e-Science and Technology 2009. **More Details of this project given in the Annex 1 (Maritime Learning).**

2. A9 NeLC Workshops Conducted during the Year 2009

Several Workshops were conducted during the Year 3 of the NeLC project to develop competency of those who directly involve in the project as well as those selected or nominated by other outside organizations.

Workshop	Date	Resource Person	No. of Participants
MIT Workshop	29/12/2008 to 9/01/2009	Prof. Lani Gunawardena	20
Curriculum Workshop for the College of Education	28/02/2009	Dr.K.P.Hewagamage	11
Java Collection Framework workshop for eLC staff	2009-03-03	Mr.Peter Mozelias	25
jeliot workshop (Visualizing using Java) for eLC staff	2009-04-03	Mr.Andre's Moreno	25
Curriculum Development Workshop for Rajarata University	2009-07-03	Dr.Ruvan Weerasingha	13
		Dr.K.P.Hewagamage	
Web Authoring(Dreamweaver) workshop for eLC staff	24/03/09, 28/03/09, 21/04/09	Mr.Suresh Rodrigo	23
Image Editing(Photoshop) Workshop for eLC staff	05/05/09, 12/05/09, 11/06/09, 18/06/09, 25/06/09	Mr.Suresh Rodrigo	22
e-Testing Skill Assessment Workshop	21/05/2009	Dr.K.P.Hewagamage	10
e-Governance Workshop	20/05/2009	Mr.Wasantha Deshapriya	5
Kuriki Content Development Teacher Training Workshop	26/06/2009	Dr.K.P.Hewagamage	12
		Miss.Thilini Ishaka	
		Mrs.Chathuri Gunathunga	
Sociology Course Development Workshop	17/07/2009	Dr.Karunatissa Athukorala	10
Workshop to Prepare e-Sri Lankan Syllabus	20/07/2009	Mrs.G.I.Gamage	5
Animation(Flash) Workshop for eLC staff	29/07/09, 05/08/09, 14/08/09 and 21/08/2009	Mr.Suresh Rodrigo	21
VCUC (Virtual Campus) Curriculum Workshop	2009-11-08	Dr.K.P.Hewagamage	14
		Mrs.Thushani Weerasinghe	
		Mis.Nisha Kumari	
Workshop on Office Skill Assessment System	5/12/2009	Dr.K.P.Hewagamage	15
		Mr.M.R.M.Sedar	
		Mr.Martijn Reijerse	
Workshop on Enosha: a Free and Open Source Learning	6/12/2009	Dr.K.P.Hewagamage	13

Object			
		Ms.Enosha Hettiarachchi	
		Mr.Isuru Balasooriya	
		Mr.Peter Mozelius	
		Mr.Mathias Hatakka	
		Total Number of Participants	150

3. Different e-learning Courses for Different Certification

3.A1 Identifying the community requirements

Like in the previous years, NeLC project continues the dialog with several parties to promote e-Learning in several avenues. Key organizations with which the NeLC Project have had discussion are given below.

1. NAITA (National Apprentice Industrial Training Authority) of Ministry of Vocational Training (Details given in section 3.A2).
2. IRQUE for testing undergraduate IT proficiency skill
3. Ministry of Education (ICT Branch)
4. ICTA (ICT Agency) for e-Testing Agency
5. University of Colombo to establish Virtual Campus for all faculties of the University
6. Telecentre.org Academy

3. A2 Developing an e-Learning course for ICT-awareness

In the initial requirement analysis of this development, it was decided to develop an e-learning course similar to International Computer Driving License (ICDL) in all three languages (English, Sinhala and Tamil) but coupled with English display (to maintain the common structure). The Curriculum, online learning resources for the online delivery of the program were developed in the second year of the project. The program was launched as FIT (Foundation in Information Technology). It is currently now available at <http://fit.bit.lk/lms>.

“FIT 101 - ICT Applications” online course was developed to promote national level Computer Driving License Skills. Students who register for the FIT program can directly register for this course to follow and sit for relevant e-Tests for knowledge and practical assessments. At the end of 2009, over 1000 Students have been accessed and followed this course.

In addition to the FIT certification program, NAITA entered into an agreement with the UCSC to launch this course as the Sri Lanka Computer Driving License (SLCDL) considering knowledge assessment, and Certified Computer Application Assistant (CCAA) and the practical assessment of the FIT 101 online course.

At the time of writing this report, more than 200 students have registered for SLCDL course through NAITA. UCSC will undertake the responsibility of maintaining the curriculum and providing testing service, while NAITA will administer the entire certification services. NAITA has also agreed to pay the service charge for services provided for this program and we expect that it would be a source of income to sustain some project activities after the end of project. These online courses are available at <http://fit.bit.lk/lms/course/category.php?id=9>

With regard to localization of FIT courses, the NeLC Project has agreed to support localization of the FIT 101 course as a service to promote community education. The online courses were completed during the third year of the project and it will be made available through Telecentre.org Academy certification. All these online courses are available at <http://uglms.ucsc.cmb.ac.lk/tasl/>.

Award of Certificates to Successful FIT Students

Foundation in Information Technology (FIT) Programme

The Foundation in Information Technology (FIT) programme was launched in the year 2008 by the University of Colombo School of Computing (UCSC) to fill a long felt gap for a recognized awareness level qualification for entry in to the job market in the emerging e-Society. It was launched under the National e-Learning Centre (NeLC) Project of UCSC, which is funded by the Swedish International Development Agency (Sida).

The main objectives of the programme include,

- Creating an opportunity for the public at large to acquire a basic literacy in Information Technology, and good foundations in Mathematics and English
- Facilitating individuals to gain competency in ICT applications which are used widely in the world of work
- Creating familiarity of the Internet and the services it provides for self learning in the emerging knowledge society
- Providing an alternative path for re-acquiring the mathematical knowledge required for higher studies in any discipline
- Improving English Communication skills for gaining meaningful employment or the pursuit of higher education
- Providing an alternative path to those who do not have G.C.E. (A/L) qualifications to enroll in degree programmes such as the Bachelor of Information Technology (BIT) degree programme conducted by the UCSC.

The Foundation in Information Technology programme consists of 3 courses which are evaluated for theory and practical. They are

ICT Applications (FIT101),
English for ICT (FIT201) and
Mathematics for ICT (FIT301).

More details can be found at the website <http://fit.bit.lk/>.

Each course will be first evaluated using a computer based test (e-test). Those who pass these e-tests would be called for practical tests (except for the course FIT301, which is completely evaluated in the online mode).

Certificates are awarded to all candidates who complete the FIT programme successfully by passing all e-tests and practical tests. **The first awards ceremony of the FIT programme was held at 5 p.m. on Thursday, 22nd October 2009 at the UCSC.** 36 students who have qualified for the award of the FIT certificate received their certificates at this first awards ceremony.

Under the NeLC Project, online e-Learning courses have been developed for all subjects of the FIT Programme. Registered students are allowed to follow these courses and complete online assignments in UCSC's virtual learning environment at <http://fit.bit.lk/lms>. No pre-conditions are required to register for the programme and online learning and testing is promoted among all registered students. An average student would need between 6 and 9 months to follow these courses and they are free to take these tests whenever they are ready.

e-Tests are usually held at UCSC's Testing Lab at its External Degree Centre on demand. Success in all the e-Tests alone will qualify a student to register for the BIT programme. Students wishing to qualify for FIT Certification however need to, in addition pass the practical tests of ICT Applications (FIT101) and English for ICT (FIT201). There is no restriction on the number of times a student may retake these on-demand e-tests. Many private teaching institutes in the country conduct classes for the FIT programme in addition to the online learning option available via the UCSC for all registered students.

From January 2008 – September 2009, 965 students have registered for this programme. 86 students have passed all e-Tests and 55 of them have registered for the BIT programme. To date, 36 students have successfully completed the practical tests and have received FIT Certificates from the UCSC at the awards ceremony. 24 of the 36 students have been in the BIT programme for 2 Semesters already, and 20% of them completed the BIT Year 1 successfully to qualify for the Diploma of Information Technology (DIT) from the University of Colombo. A further 50% of these 24 students have very good grades in the BIT exams held during the 2008/09 academic year. In this way, the FIT programme has established an online learning path for the general public to obtain a quality, affordable and accessible IT Certification, while at the same time providing an alternative path for individuals who missed the opportunity to join an IT degree programme. As a prime mover in the higher education space in Computer Science and Information Technology, the UCSC is proud to announce yet another of its significant contributions to the nation, in this, the Year of ICT and English.



First Batch of FIT Certificate Holders and more photos of the ceremony is at <http://picasaweb.google.com/nelcproject/FITCertificateAwardCeremony2009#>

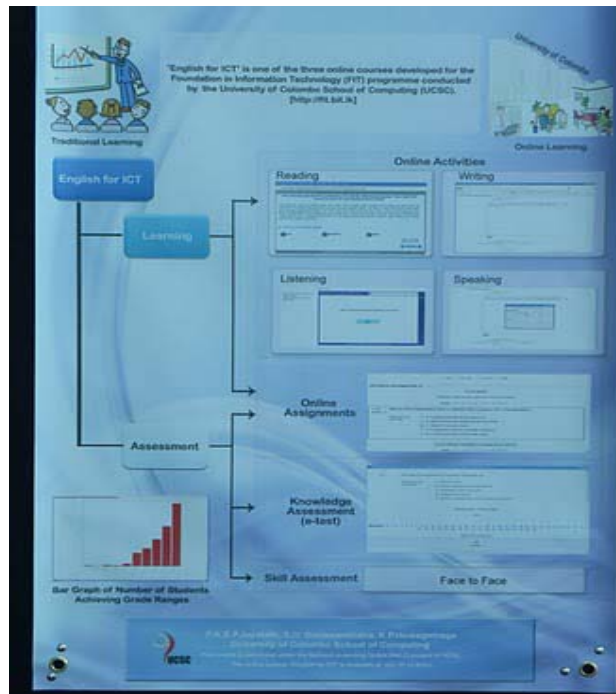
3.A3 Developing an e-Learning course to improve basic knowledge in general mathematics

In the requirement analysis of community education and common difficulties one of the main obstacles faced by students is identified as they start professional or higher education, is the lack of knowledge in mathematics and general knowledge. According to records available with the Ministry of Education, the failure rate of secondary school mathematics (GEE O/L), is increasing. The online course is fully developed and deployed during the second year of the project. At the end of third year (2009) 1100 students have accessed this online course. This is a compulsory course for FIT certification. According to statistics, this is the most difficult course students have faced compared to other courses in the FIT program. The online course is available at <http://fit.bit.lk/lms/course/view.php?id=3>.

3.A4 Develop e-Learning courses for the English Language learning

Development of e-Learning courses for language learning seems to be a very tough assignment compared to others. However, a group has been formed to start the initial analysis and prototype development. Online course English for IT and Communication was launched and deployed at <http://fit.bit.lk/lms/course/view.php?id=5>. At the end of third year, more than 900 students have registered for this online course and this is also a compulsory course for FIT Certification.

Development and deployment of this online course is a kind of research and development activity. In this development, voice based server called Gong Server was installed to provide online asynchronized interactions with the server in our online VLE. Based on this new development and learning resources, a paper was submitted e-Asia 2009 conference available at <http://www.e-learning.lk/vle/course/view.php?id=6>. A poster was presented at e-Asia conference to promote this online English learning course.



Poster of online Language course at e-Asia 2009.

3.A5 Establish Large scale online certification “e-Sri Lankan”

This is the major contribution that was done targeting the community education and ICT awareness through online learning. The course was fully developed and it is free to access for any one under online learning Environment. This course as well as all other public courses are available at <http://www.e-learning.lk/vle>. Currently online certification for e-Sri Lanka is launched with NAITA and online testing course is available at <http://fit.bit.lk/lms/course/category.php?id=9>. At the end of third year 2009, only English version of this testing available but we expect to launch both Sinhala and Tamil versions during the fourth year of the project.

3.A6 Development of non-ICT Courses

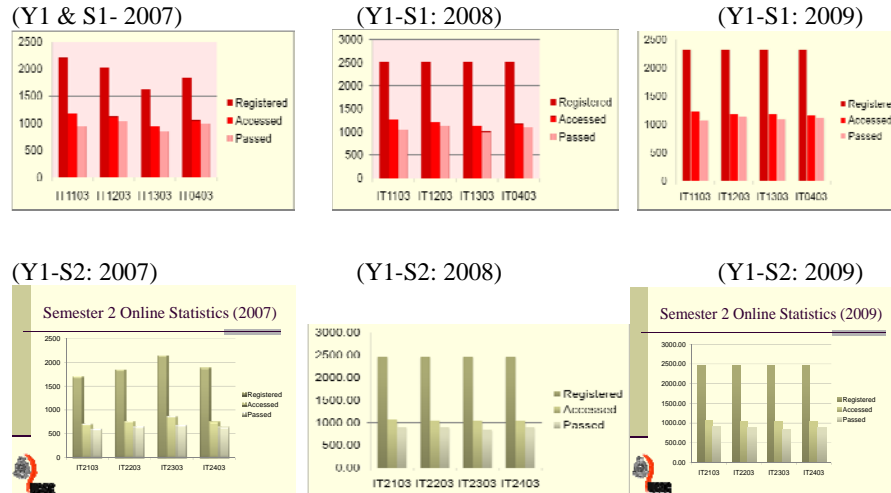
During the third year of NeLC Project, we started developing 6 non-ICT courses to evaluate the applicability of e-Learning in other fields. However, we faced lots of practical issues when we hired subject matter experts outside UCSC and failed to complete any of those development. We are planning to get their support during the Year 4 of the project to get these done and will report the final status in the Fourth Year of the project progress review.

4. An online degree program for the ICT capacity development in developing countries as a model

4.A1. Planning the online degree program

In the first two years of NeLC project, we concentrated on the development of online courses for first two years of BIT Online Degree. In the third year of NeLC 2009, we concentrated on the development of Third year online courses and deployed them for all BIT students. As a result, e-BIT online degree program has become a fully online degree program covering the full curriculum. UCSC Virtual Campus at <http://vle.bit.lk> now facilitates all registered BIT students of past and present.

With these online courses, we have observed a significant increase in the pass rate, and a similar significant decrease in the drop out rate. Details are summarized in the following table.



Year 1 Output – LMS Access and Performance

Academic Batch	Pass	%	Sat	NA	Attem pt	NE	---	Reg.
2007	496	43%	1163	766	60%	5	527	2461
2008	718	48%	1484	800	65%	6	391	2681
2009	746	47%	1571	723	68%	106	375	2775

Year 1 Outcome (S1 & 2)

Year	New Registration	Total Registration	Pass Rate in Year 1 of BIT			
			New Registration	All	Pass Rate	Drop Out
2005/2006	1516	2833	113	7%	342	12%
2006/2007	1195	2461	251	21%	528	21%
2007/2008	1558	2681	288	18%	607	23%
2008/2009	1540	2775	164	11%	429	15%

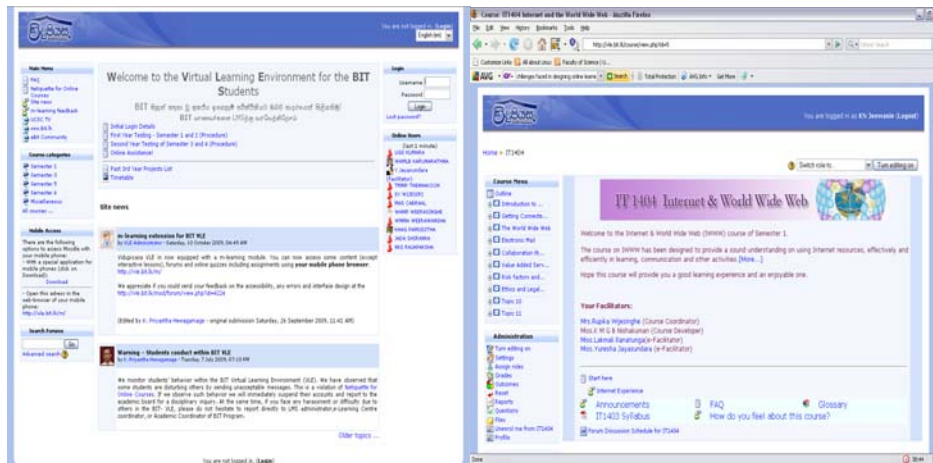
Details analysis of these statistics gather are being evaluated together with their other student details for analysis. Year 2 and Year 3 statics are being

collected at this stage of writing for the detail analysis since final results of some academic years are still pending.

4.A2 Set up and Administrate the Virtual Learning Environment (VLE)

Moodle based LMS is further enhanced to set up the Virtual Campus Interface during the third year too. Localization work further improved and published among Moodle community. As a result, Sinhala and Tamil (Sri Lankan version, which is different from Indian tamil) is available for the interface. SCORM based online lessons are further investigated to find out the transfer of scores between LMS and interactive activities in the SCORM lessons. A Swedish team also contributed to carry out this work.

In the second year, we observed several service issues due to overload of students near the deadline and when we increased number of students who are working on the same server. In the third year, a new server was deployed with more capacity and investigations were started to develop a small server farm during Year 4 of the project. At the same time, we decided to complete the revision of the user interface based on the experience gathered during first two years to gather more details. Online system is available at <http://vle.bit.lk> and some sample images given below.



New Interface developed during 2009 for the Virtual Campus of UCSC.

A virtual learning environment cannot exist alone without the support of the proper student administration environment. Moodle LMS has very low support with respect to student administration and the requirement of setting up a proper student administration & information system was planned to realize in the future. Hence, the development work of Student Information System (SIS) for the Virtual Campus was started and 50% of the work has been finished at the end of the Year 2009. A component of this student information system was used to entertain application online for the registration and it is available at <http://pglms.ucsc.cmb.ac.lk/bit/>. The development work was done as a sub-project of nelc

by the software development unit of UCSC. m-Learning extension to Vidupiyasa (<http://vle.bit.lk/m>) and the UCSC.tv (<http://www.ucsc.tv.lk>) (Vidudahara) [Details given in the Section 2 of this report) are the other major achievements during year 3 of NeLC Project. These extensions created a very

advanced environment together with the state of the art features for BIT online degree program.

4.A3 Curriculum Development of e-Learning Course

In the planning stage of this project, the importance of the curriculum development was identified as a key requirement before developing e-Learning materials. Specially, developing curriculum to deliver a course as a distance education program, it is necessary to go beyond a conventional curriculum. Not only for students who will enroll in the course, the developers of the online courses (both Instructional designers and content developers) will find detail description as a useful resource for developing e-learning materials.

Hence, curriculum development work conducted for Year 3 BIT degree program during 2009. A special attention was paid towards the BIT Final Year Project course, since it is the most critical course which was affecting the pass rate of the BIT program. Current Moodle course was customized in a way to suit large number of individual projects. However, it was not a perfect approach and we discovered many limitations. New module is planned to be designed to cater to this requirement,

Hence, e-BIT online degree program now consists of 28 online courses covering the full curriculum of the BIT program.

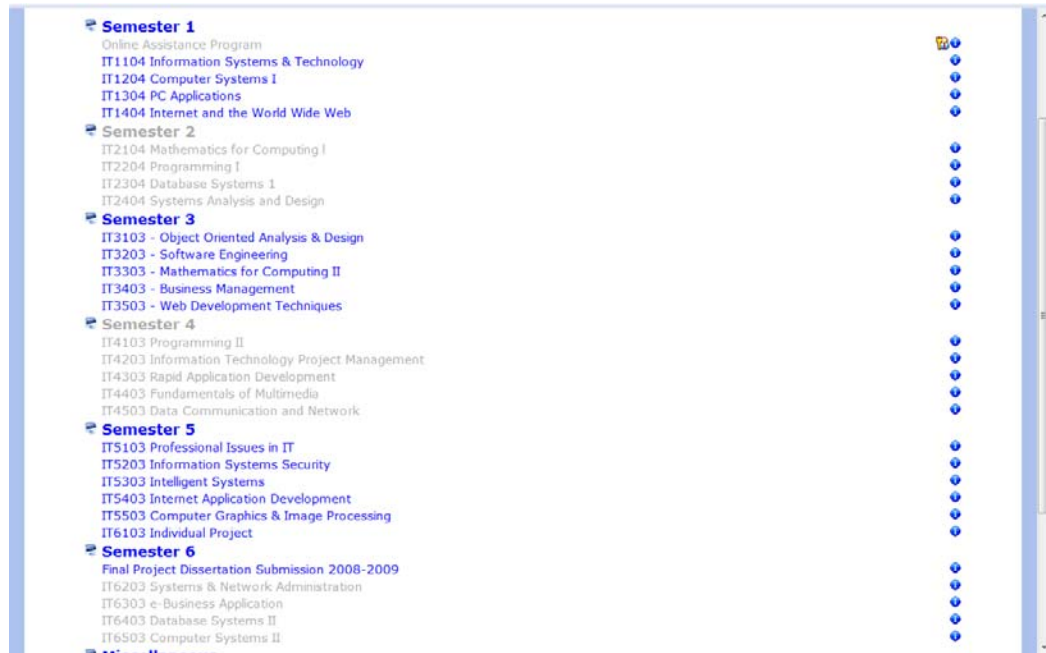
4.A4 Development and deployment of e-Learning Courses for the Academic Year 1, Academic Year 2 and Academic Year 3 of BIT Online Degree

Methodology established to develop e-Learning materials were further enhanced during the second year of the project. Activity based online e-Learning courses became the common pedagogical design structure for all courses in the second year. SCORM compatible light weight structure was the main criteria adopted in the development of e-Learning courses.

During the third year of the project:

- 8 e-Learning courses developed for the Year 1 of the academic year were revised.
- 10 new e-Learning courses were developed.
- 10 more new courses were developed for the academic Year 3 of BIT Degree Program.

Course titles are displayed in the picture shown below.

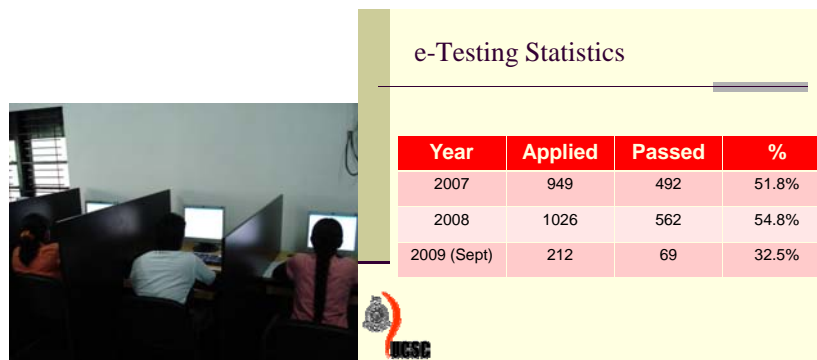


Online Courses available in the e-BIT VLE.

4.A6 e-Assessment for the degree program

One of important aspect in an online degree program is to provide effective and efficient learning environment which can also be used as a teaching tool. Hence the assessment is divided into two sections called the formative and summative assessments. The formative assessment was given as two assignments in each course. Since the number of registrations were very high in the first year, traditional semester exams were held as the main summative assessments. At the same time, we developed real time testing system to conduct summative tests at the NeLC testing centers. However, we have not yet made this option operational due to some practical issues.

We have already used summative testing system to evaluate students to enter into the study program. NeLC Project funds were used to set up a modern testing lab which is now available as the testing centre for eBIT degree program. e-Testing center was used to conduct testing for eBIT selection as well as FIT program too.



Conduct of e-Section Test at the e-Testing Centre and Statistics during 3 years.

4.A7 Facilitation of the e-Learning Courses

Though the importance of e-facilitation in this degree program is duly recognized but it is not possible to directly implement this due to large sizes of students in the batches. e-Facilitation was carried out using online program through the virtual learning environment. This program was called online assistance.

However, in order to promote student participation, it is necessary to introduce some recognition for their active participation. Hence, a new promotion scheme called, “**Best e-Learner Award**” for each semester was introduced under the sponsorship of NeLC Project and Sida. Based on the student participation, academic committee appointed by the relevant board of study selects suitable candidates for this award. Every year, this award will be made at the annual certificate award ceremony. The NeLC project wishes to extend its sincere gratitude to the Swedish International Development Agency for their contribution to develop this online learning environment.

5. A National Centre of excellence in e-Learning, which will provide consultations and services to promote e-learning in Sri Lanka and other Asian/developing countries

5. A1 Promote e-Learning at National level

“e-Learning: the way forward” – is the theme introduced by the NeLC Project to promote e-Learning in Sri Lanka from the very beginning of the project. This was used as the main motto / theme at the launch of e-BIT Programme in 2007. Many activities carried out during the second year of NeLC Project highlighted this theme as described in the last year report.

Nelc project promotes e-learning by demonstrating the reality of e-Learning opportunities and disseminating knowledge and experience. e-BIT is used as the main model to demonstrate the applicability of e-Learning. The e-BIT product was demonstrated among all university stakeholders several times during third year too. In addition, the project’s output and progress was submitted to several independent competition for evaluation during Year 3.. Following awards were received for the e-Content and the progress of the project during last three years.

a. UNESCO ICT in Education Innovation Awards, 2007-2008 for NeLC Project

“e-BIT: Innovative use of ICT to produce ICT professionals” was received a recommendation award

URL: <http://www.unescobkk.org/index.php?id=7744>

(for newsletter and details at)

[http://www.unescobkk.org/index.php?id=6808&tx_wecknowledgebase_pi1\[cat\]=28%2C29%2C39&tx_wecknowledgebase_pi1\[ps\]=1217523600&tx_wecknowledgebase_pi1\[pL\]=2678399&tx_wecknowledgebase_pi1\[arc\]=1&tx_wecknowledgebase_pi1\[pointer\]=1&tx_wecknowledgebase_pi1\[tt_news\]=1143&tx_wecknowledgebase_pi1\[backPid\]=6771&cHash=e23d885bb6](http://www.unescobkk.org/index.php?id=6808&tx_wecknowledgebase_pi1[cat]=28%2C29%2C39&tx_wecknowledgebase_pi1[ps]=1217523600&tx_wecknowledgebase_pi1[pL]=2678399&tx_wecknowledgebase_pi1[arc]=1&tx_wecknowledgebase_pi1[pointer]=1&tx_wecknowledgebase_pi1[tt_news]=1143&tx_wecknowledgebase_pi1[backPid]=6771&cHash=e23d885bb6)

b. e-BIT from NBQSA award (2008)

http://www.nbqsasilanka.org/winners_2008

c. National selection for the Word Summit e-Content award, <http://wsa.nenasala.lk/>

(2008/2009)

d. e-Swabhimani - National Best e-Content Award - Sri Lanka 2009 (Two

Awards) <http://nca.nenasala.lk/>



Vidu Piyasa (The best Virtual Campus for ICT Education in Sri Lanka)

Vidu Sayura (The best Award for e-Science and e-Technologies in Sri Lanka)



More details of Vidusayura Project and its awards are given in the Annex 1.



5.A2 : Manage the Project effectively and efficiently

After the first year evaluation, an agreement was signed between the SPIDER and UCSC to obtain the Swedish input and participation for the project activities. This agreement was signed based on the MOU signed at the beginning of the project and also considering the collaboration expected in the program. During the third year of the project, this agreement was updated to include PhD study of Mr. Hiran Ekanayake.

NeLC Project Management Committee (PMC) functions as the steering committee of the project. The PMC conducted monthly meetings and workshops for analyzing and designing

project activities during the third year of the Project too. All administration and financial decisions are approved by this committee, which is chaired by the Director of UCSC who is also the Chairman of the Project Management Committee and serves as a Project Consultant too. The project coordinator presents all matters related to workshop.

Minutes of the meeting are maintained by the Senior Assistant Registrar of the UCSC and important matters were reported to the Board of Management of UCSC and other relevant committees and study board of UCSC.

5.A3 Links and collaboration for e-Learning

In order to promote e-Learning among different types of learners, it is important to collaborate with other Institutes who are willing to integrate e-Learning to enhance education. Some Main organizations are ICT Agency (ICTA), Ministry of Education (MoE), National Institute of Education (NIE), National Apprentice and Industrial Training Authority (NAITA), IRQUE project of Ministry of Higher Education, and several other institutes who want to expand their scope of business through e-Learning.

Ministry of Education (MoE), ICT Branch is the main division which works together to introduce e-Learning at secondary education. Under NeLC project, we have trained 16 teachers as key trainers for school teachers. During this training sessions we have developed a few e-Learning lessons to identify the methodology and to evaluate using other stakeholders.

These courses were published under the schoolnet of Ministry of Education. (<http://lms.schoolnet.lk>). During the third year of the project, these published modules are promoted among possible stakeholders and new online learning modules are further added to this Online Learning Environment. In addition to these online modules, Curriki Project is one of key thing started during the Year three of the Project (<http://curriki.schoolnet.lk>) to promote e-Learning content development at the National level. In addition, the research, development and training of OLPC in Sri Lanka was other collaboration between NeLC Project and Ministry of Education during 2009.

The collaboration with NAITA (National Apprentice and Industrial Training Authority) is the most significant partnership that was built during the Year 2009. A MOU was signed to launch the Sri Lanka Computer Driving License (SLCDL) programme at a special function.. It was agreed to pay a portion of income from SLCDL and we expect this income will contribute to the sustainability of e-Learning Centre after the funding from of Project is over. In addition to SLCDL, a new certification program called e-Sri Lanka Certificate was also launched as a new way of promoting ICT Literacy through online learning and testing environment. e-Sri Lanka course will be available in all three languages @ <http://fit.bit.lk/lms>. Currently, more than 1000 students have registered to obtain SLCDL and e-Sri Lankan certificate through NAITA.

5.A4 Develop Technical Infrastructure of e-Learning Centre

In the third year of NeLC Project, the infrastructure development activities was also carried out specially, considering the technical issues that are being faced. Due to several services, the back storage facilities were not adequate and as such new servers were added to network to provide improved services of NeLC.

5.A5 Develop Human Capacity of e-Learning Centre

This is the most critical factor, which affects the progress of the project, and it is also the most difficult thing to manage. Project staff who obtain the training sometimes suddenly resign without adequate prior notice when they find good opportunities in the industry. Therefore, the knowledge transfer is critical to maintain and transfer among new members who join the project activities. On other hand, those who have resigned and join other universities and industry are also promoting e-Learning based on the knowledge and experience obtained through NeLC project.

During the third year of the project, an average of 25 members, including research students were working on fulltime on project related activities at the e-Learning Centre of UCSC.

During the third year too, the project is directly managed by the coordinator who is a fulltime senior staff member of UCSC, Dr. K. P. Hewagamage. The Senior Assistant Registrar of UCSC, Mr. Krishanthan, supports the coordinator to manage staff of the project. Two team leaders and e-Learning centre secretary, manage the staff related matters and organize human resource development activities during the third year of the project. All project related matters were reported to the Project Management Committee (the steering committee of NeLC Project), for the formal approval. PMC meetings are held monthly and the Project Administrator maintain all these records.

5.A6 Participation and Contribution to National & International Events in e-Learning

In the NeLC Project, third year is most important year where we planned to make the biggest impact based on e-Learning within the region. Regional conference was planned as an event to share what we have achieved in this project as well as to learn from others to go beyond our expectation. Rather than developing our own conference, we decided to look for suitable opportunity to collaborate and link with other organizations. The Government of Sri Lanka declared 2009 as the “Year of IT and English” and it was a good opportunity to held a significant event in Sri Lanka.

PMC of the NeLC Project identified the e-Asia conference as one of the ideal regional event and held some informal discussions with CSDMS, an Indian government organization which organizes this regional conferences outside India. Subsequently, the PMC members were able to promote ICT Agency representatives to link with CSDMS and hold e-Asia 2009 as the biggest ICT event to promote e-Learning and other related online technologies.

Three of NeLC PMC members became members of e-Asia 2009 organizing committee. At the same time, we undertook managing and organizing e-Asia Digital Learning, Telecentre Forum and e-Health tracks to be sponsored and supported under NeLC Project. Rather than becoming financial sponsor of e-Asia 2009, we became the back end force to organize and conduct this successful event in 2009. NeLC Project sponsored the online version of digital learning track as well as the print of Book of Abstract, e-Asia 2009. This conference was the main opportunity to show case NeLC Project progress and activities achieved during last 3 years.



In addition to conference, NeLC Project also actively participate e-Asia 2009 Exhibition to promote e-Learning among general public. His Excellency the Sri Lankan President also visited to observe NeLC exhibits and also drew tremendous public response at the e-Asia 2009 exhibition. Some photos are given below.



3. Project Outcome at the end of Second Year

	Intervention logic	Objectively verifiable indicators	Value at the end of Second Year
Long Term Objective	For the development and poverty elimination in Sri Lanka, all sectors of education (HE, SE, CE and PE) are enhanced through proper integration of ICT based services.	Number of recipients who have received e-Learning based services in different sectors Number of people who have received specialized training in e-Learning	= 12 [7 Universities, Ministry of Education, National Institute of Education, CRCs, NIITA, MoHE, ICTA] = Over 600 [based on the courses and workshops]
Specific Objective / Project Purpose	Design, Develop and Publish more effective, efficient, scalable and economical e-Learning Framework which can be used in HE, SE, CE and PE.	Number of resources available in this framework Number of students enrolled in the online program and their satisfaction. Number of people who have received specialized training Number of e-Learning courses available for different sectors	= over 1000 resources to develop online e-Learning services (including localization) = Over 9000 Students who have accessed online environment [http://lms.bit.lk/lms] = Over 600 [based on the courses and workshops] = Over 33 online courses
Expected Results	1. Postgraduate and Research Programs to develop human capacity in e-Learning. 2. Methodologies, systems and resources including specialized training programs which can be used to create e-Learning courses and services. 3. Different e-learning courses for different certification. 4. An online degree program for the ICT capacity development in developing countries as a model	1.I1 Number of R&D Projects 1.I2 Number of postgraduate programs 1.I3 Number of workshops conducted 1.I4 Number of students enrolled in the postgraduate program 1.I5 Number of publications wrt e-Learning 2.I1 Number of outputs which can be used to develop services and/or to solve problems 2.I2 Number of training programs conducted 2.I3 Number of internal staff trained 2.I4 Number of external staff trained	1.I1 = Over 20 projects 1.I2 = Master of Information Technology (e-Learning) with 30 students, 3 split phds, and 7 mini-split mphils 1.I3 = Over 35 1.I4 =Over 30 students 1.I5 = More than 30 papers 2.I1 = learning objects from 35 online courses and system development work 2.I2 = over 25 courses (including CRC teachers) 2.I3 = Over 40 staff 2.I4 = Over 25 staff

	<p>5. A National Centre of excellence in e-Learning, which will provide consultations and services to promote e-learning in Sri Lanka and other Asian/developing countries.</p>	<p>3.I1 Number of e-Learning Courses developed 3.I2 Evaluation results of e-Learning courses developed 3.I3 Number of students enrolled and successfully completed 3.I4 Number of collaboration with external organizations and their level of satisfaction</p> <p>4.I1 Percentage of development of online degree program 4.I2 Number of students enrolled in this program 4.I3 Student satisfaction about services in the online degree program 4.I4 Student performance in the degree program 4.I5 Independent evaluation of the degree program</p> <p>5.I1 The number of different services NeLC can provide. 5.I2 The number of trained staff at the e-Learning Centre. 5.I3 Number of assignments/services provided to the external parties. 5.I4 Number of external organizations which have received assistance from the NeLC.</p>	<p>3.I1 =Over 35 courses 3.I2 = National and International Level Recognition – 4 Awards 3.I3 = FIT Program (Over 1000 enrolled and around 50 successfully completed) 3.I4 = Higher satisfaction ICTA, MOE, NIE, and Other universities</p> <p>4.I1 = around 90% completed 4.I2 = e-BIT Program: Number of enrolled over 9000 4.I3 = High satisfaction and more demand 4.I4 = Passed Rate Increased around 3 Times 4.I5 = UNESCO Award and e-Swahabihimani awards</p> <p>5.I1 = 5 (e-Content development, Facilitation, LMS, Localization) 5.I2 = Over 30 staff 5.I3 = Over 8 assignments 5.I4 = Over 25 organizations (including CRCs and Nanasala)</p>
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Appendix 1 (1.A1) Progress of split-phd programs

Candidate Name: Ms T A Weerasinghe - PhD Study at the University of Stockholm in “Critical Analysis of e-Learning Behaviors in e-Learning environment”

Progress report by Thushani A. Weerasinghe

I obtained the degree, licentiate of philosophy in May 2009 from the Stockholm University, Sweden. Following are the details of the conducted research activities, published research papers and the completed courses during the year 2009.

Completed research activities 2009:

- Writing of the licentiate thesis (licentiate seminar was held in April 2009)
- Design of one or more online courses (based on results of the design paper and the action research paper)
- Design of online activities based on Web 2.0 technologies for the undergraduate students following Instructional design course at the UCSC
- Starting of second empirical study; collecting data from the BIT 1st semester students of the UCSC
- Collect data from the instructional designers at the UCSC

Papers published during the year 2009

Name of the Paper	Name of the Conference/Journal	Date/Year
Design of an Online Learning Environment for Distance Learning	International Journal of Instructional Technology and Distance Learning, vol.6, no. 3.	March 2009
Guidelines to Design Successful Online Learning Environments	e-Asia Conference	2-4 Dec. 2009

Courses completed:

Name of the Course	Number of Credits	Completed Date	Examining Department
Learning theories and instructional design	7.5	2009-04-15	DSV, Stockholm University/KTH
Action Research Planning	2.5	2009-04-18	Umea University, Sweden
New technologies of e-learning 2.0	5	2009-04-18	Umea University, Sweden
Learning and information technology	7.5	2009-04-23	University of Gothenburg, Sweden

Candidate Name: Mr. T M H A Usoof - PhD Study in “Unsupervised e-Assessment” at the University of Umea.

Progress for Year 2009 (3rd Year of Study)

By Hakim Usoof, Doctoral Student, Umeå University, Sweden

Description of Study: Research Title

Unsupervised summative e-assessment for higher order skills of students in large groups.

Aim

The aim of this study is to examine the impact the (Multimedia Integrated Formative Peer Assessment) MIFPA Model has on the student learning, the learning process and students’ attitudes. The MIFPA Model was designed using data gathered in the preliminary study and through a literature review. Student learning is researched by the study of their outcomes of learning. The Learning process will be research according the concept of Assessment *for* Learning.

Research Questions

1. What is the impact of the MIFPA model on the learning process, student learning and students’ attitudes?
2. What is the impact of the MIFPA model in assessing students with different levels of competence and different attitudes?
3. How can candidates be verified and what measures can be taken to minimize plagiarism?

Progress & Status:

A thorough Literature Review and preliminary data gathering was conducted to formulate the main study, while following courses related to the subject area and research methods. The Main study will be an online Peer-Learning/Assessment system where students will take part in activities. These students will be my main researched group. The main study was to be conducted during Oct 2009-Feb 2010, but due to the lack of participation and time taken for Learning Community Building, the process was postponed to Mar 2010 – July 2010. Currently there about 25 student in the learning group taking part in various activities intended on building a Learning Community.

Plan:

The Current plan is to complete the Main study and data gathering by July 2010 and then publish papers based on the main study. Also as the Final Publication will be a collection of papers and a Kappa, that process will be done during my Last visit to Sweden from Aug 2010 – Mar 2010 (With 4 months extension it could last upto June 2010). The tentative date of Defence would be in March 2010 or June 2010.

Planned Publication:

- A Journal Paper based on a refined version of the ECER 2009 Paper
- A Journal Paper based on the ERLI 2009 Poster Presentation
- A Book Chapter in the book “Cases on Professional Distance Education Degree Programs and Practices: Successes, Challenges and Issues” Hershey, PA: Information Science Reference, IGI Global Inc.

Achievements in 2009

Courses:

- The Research Process (15 Credits)
- ICT, Media and Learning Part II (7.5 Credits)

Conferences:

- ECER 2009, Vienna
- EARLI 2009, Amsterdam
- eAsia, 2009, Colombo

Publications 2009:

- | | |
|-------------------------|---|
| ECER 2009, Vienna - | Improving student learning through assessment for learning using social media and e-Learning 2.0 on a distance education degree programme in Sri Lanka
<i>Hakim Usoof & Gihan Wickramanayake</i> |
| EARLI 2009, Amsterdam - | Studying writing profiles with keystroke dynamics using fuzzy logic and statistics
<i>Hakim Usoof, Eva Lindgren, Roshan Yapa & Nishantha Karunarathne</i> |

Candidate Name: Mr. Hiran Ekkanayake , Phd Study at Skovde, Stockholm and University of Colombo School of Computing. Study was started in August 2009 proposal and progress was given below.

PhD Research Proposal

Hiran Ekanayake, hiran.ekanayake@gmail.com
University of Colombo School of Computing, Sri Lanka
May, 2009

Proposed Supervisors: Professor Tom Ziemke¹ and Professor Robert Ramberg²

¹Department of Computer Science, University of Skövde

²Department of Computer- and Systems Sciences, Stockholm University

Automation of Learner Performance Detection and Mental Guidance in Affective Game-based Learning

Overview

My research will be at the junction of simulation and game based learning, cognitive psychology, affective computing, digital signal processing and pattern recognition. I will investigate the theoretical foundation of automating the detection of learner performance in simulation and game based learning environments using detectable physiological signals reflecting attention and emotional aspects to avoid negative socio-physiological tendencies and to guide the learner in the learning process. The investigation also includes a proposal of a low cost hardware software arrangement implementing the proposed solution addressing problems in highly dynamic learning environments.

This document contains an elaboration of the research problem and the proposed methodology. Since the proposed research contains extensions to my previous MPhil research, the document also discusses some of the findings I will intend to use for my new research.

Research Problem

E-learning has changed the traditional teacher-centered learning approach to a more student-centered learning approach benefiting a large number of student population. Although, a successful learning process is an emotional and personal experience that is addictive and motivates learners to proactive behavior [1], the current e-learning approach restrains most of these factors. Addressing this issue, recent developments in affective computing and emotional approaches have revealed many relationships to recognize human cognitive emotional aspects from their bodily responses to improve the computer based educational systems [2].

Recently the e-learning has enriched with simulation and game based learning methods. Literature suggests that digital games based learning has the potential to provide deep engagement, motivation for persistence and custom learning experience to learners while promoting long-term memory and providing practical experience [3]. However, frequent use can bring negative socio-psychological tendencies, such as addictive and health implications [4]. Therefore, it is important that this is used carefully to achieve a proportional learning performance.

Since there is lack of research to identify learner performance and to overcome negative socio-psychological tendencies in such highly dynamic simulation and game based learning environments, my research is to investigate a solution to this problem using learner affect signals. The following lists the main objectives of my research.

- Investigate relationships of learner performance and negative socio-psychological implications to attention and physiological responses in simulation and game based learning.
- Propose most appropriate and low cost hardware and software including placement of sensors to capture attention and physiological responses in such highly dynamic learning environments.
- Conduct experiments to identify the features and parameters that can be recognized from

captured signals to explain the learner performance and negative socio-psychological implications.

- Automate the feature recognition process using artificial neural networks and association of feature to the details of simulation and game based learning content.
- Evaluate the final system using different categories of learners.

Research Plan and Methodology

[2-3 months] The preparation phase of my research will involve a study through literature exploring simulation and game based learning. The study will include an investigation of methods to identify learner performance and negative socio-psychological tendencies and their detectable physiological responses. The study will also include an evaluation of existing hardware software environments, but specifically targets the simulation and game based learning platforms used at the cognition and interaction lab of University of *Skövde*.

[4-6 months] Although the literature of my previous research provides an essential basis for theoretical and empirical investigation of attention and psychophysiological signals, for this new research, I will need to extend the investigation exploring the theoretical and empirical basis of such signals under highly dynamic environments. For this new domain I will have to use capturing devices having higher accuracy and sampling rates. From my previous research I have identified that commercially available capturing devices satisfying such requirements are very expensive. Therefore, I will have to explore possible low cost solutions depending on the research budget and practical use of the system. Since the learners are expected to have lot of body movements, the electrode placement will be tricky to allow free movements and avoid muscle artifacts reflected in captured signals. Therefore, several experiments will need to be conducted to find an optimal solution to these requirements.

[2-3 months] Next, the signals from attention and affect capturing devices have to be visualized and recorded in the computer for analysis purpose. For this a sophisticated software package will be required that is capable of processing multiple signals under real-time constraints and higher sampling rates. In my previous research I have failed to find a low cost and flexible package that can be used for this purpose. The required software should also be able to record the details of simulation and game interaction for later analysis. Therefore, my study will include an exploration of existing software packages that can be used for this purpose and investigation of possible solutions to simultaneously record details of simulation and game interaction for the analysis.

[2-3 months] Once the hardware and recording software have been setup, my next phase will be to conduct some experiments using few learners and record affect and attention signals while they engage in learning tasks. After having sufficient number of samples, I will analyze detectable features of those signals with the intention to find correlations to learner performance and negative socio-psychological tendencies.

[4-6 months] The manual detection of features will be time consuming and not accurate. Therefore, I will investigate an appropriate artificial neural network approach to automate the feature extraction from the signals and to associate the features with the details of simulation and game interactions. These features will provide a basis to identify learner performance and to guide the learner avoiding negative socio-psychological tendencies. I will also investigate techniques I can use to minimize processing latencies due to the use of a complex software processing chain to allow the system to respond in real-time with the intention to practically use the system in educational systems. The study will also include an investigation of how these features can be organized in a repository to buildup profiles of personal settings.

[4-6 months] Final phase of my research will include an evaluation of the system using learners from different categories, such as age and gender, with the intention to prove that the learning can be improved avoiding negative socio-psychological tendencies under the new solution.

[6-9 months] The rest of the period will be spent for writing the PhD thesis and preparation for the defense.

My Previous Research

The research work I have conducted for my MPhil [5,6] involves proposing a method to determine the psychological involvement of a human user in a computer-based multimedia interaction using Electro-oculogram (EOG) signals to determine the quality of visual attention and Galvanic Skin Response (GSR) signals to determine the emotional reaction, where most other solutions rely on unreliable facial expressions, sophisticated brain scan technologies and expensive hardware, such as eye trackers. Based on the recognized behavioral patterns of EOG and GSR signals several classes of involvement have been proposed. The solution is based on low cost hardware software arrangement.

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Progress during 2009 – Reported by Mr. H.E.M.H.B. Ekanayake

Under my split Ph.D award I have commenced my studies at University of Skövde, Sweden, on 28th September, 2009. My supervisors are Prof. Tom Ziemke, University of Skövde, Prof. Robert Ramberg, Stockholm University, and Dr. K.P. Hewagamage, UCSC. For my Ph.D I am conducting a research in affective game based learning area. The aim of my research is to detect negative tendencies and the learning performance of a learner player based on affective feedback in simulation based serious training games to improve the learning experience. The following lists the sub-goals I have identified to focus on during the course of my studies:

- Select appropriate affective sensor modalities and sensing equipments,
- Propose an appropriate affective interfacing method for the game engine,
- Find the correlation between selected affective signals and accepted level of engagement of the player,
- Find the correlation between selected affective signals and identified negative tendencies of the player,
- Find the correlation between selected affective signals and expected learning performance of the player,
- Identify the variables that have influence on the above results under different individual players, and
- Identify appropriate pattern recognition and classification algorithms to process affect signals for the detection of negative tendencies and learning performance.

Progress and status

The first three months, which covers the progress of my studies during 2009, I have basically tried to elaborate the problem domain of my research. I did some readings on serious games and affective games and identified which game based training systems I should focus. Under the assistance of my supervisors I could initiate collaboration with InGaMe lab at University of Skövde. Moreover, I could identify few neurofeedback sensing equipments suitable for used in game based training environments. At the moment I am evaluating the Emotiv Epoc headset.

Things achieved during 2009

- Participated in SweCog conference and presented my research proposal.
- Presented a poster at the inauguration of Portalen at University of Skövde.
- Elaborated my research framework.

Current updated plan

Stay both Spring and Fall semesters of 2010 in Sweden. Take some Spring semester courses at University of Skövde. Focus more on my research during the Spring semester.

Appendix 1 (1.A3) Progress of mini-split mphil/phd programs

Candidate: P.K.M. Thilakarathna

Title: HOW TO IMPROVE THE EFFECTIVENESS OF PEER GROUP LEARNING ?

An information technology based approach to build a collaborative peer group learning framework on top of an ad-hoc network

Progress Report:

Activities Carried Out During 2009

As an initiative, we carried out several field studies to observe informal peer group learning activities at University of Colombo School of Computing. By observation, we found out that even though students use laptop computers within informal peer group activities, they don't seem to utilize the resources of laptop computers. That is, wireless networking enabled laptop computers can be used more effectively in an informal peer group learning discussion. Thereby, we were interested on finding out about the intention of laptop usage from students viewpoint. Therefore, we randomly selected students from every year of undergraduate programs, both male and female, and conducted interviews, both formal and informal, to get a thorough understanding about the phenomenon. The interviews helped us to understand the phenomenon in detail and also to identify limitations of existing role of a laptop in an informal peer group discussion. Hence, it helped us to understand the requirement of a specialized software that can help students when doing informal peer group activities. Thereafter, we seek for an existing solution to cope the particular informal peer group learning phenomenon. We found out that there are a number of research have been carried out by researchers in this path. However, reading literature and studying the outcomes of those research, we identified the limitations of existing solutions. Most of the tools were developed to use for remote learning. Therefore, they have server client architecture with a centrally located server. Several other research has been carried out to find a solution in an isolated environments with using mobile technologies. However, they also have major limitations such as every application should be built from the scratch to be used under provided application framework solution. Analysing most of the aspects of the phenomenon and studying existing technological solutions, we opted to use screen sharing technology to provide a solution to overcome the limitations when using laptops in an informal peer group learning activity. Therefore, we studied screen sharing tools and applications which potentially be used to cope informal peer group learning. We came across with so many tools and applications for remote conferencing and remote learning which uses screen sharing. We studied those tools and documented provided features by each tool and applications. Afterwards, we compared existing tools and applications to find a suitable tool for use in the phenomenon of our concern. Since, most of the tools and applications are for remote learning, we identified most of the tools and applications cannot be used in an environment that we are studying. However, it should be mentioned that we couldn't find a comparative study such as we did on existing literature and therefore, it would be a contribution to the community. Screen sharing is a widely used methodology and there are even several open source tools for screen sharing. However, their main purpose is to help remote administration. There is no point in reinventing the wheel. Therefore, we decided to choose the best possible open source solution that we can adopt to use in informal peer group activities. Therefore, we benchmarked available open source tools for their processor and network usage and choose the best performing tool to use as a component of our solution. Currently, the screen sharing component is working fairly acceptable manner and we are working on the networking component of it. In addition to that we conducted a survey study to identify the popularity of informal peer group learning activities among students. In addition to that, we used the same study to gather the information about the amount of laptop computer owners as a percentage and to evaluate identified limitations. Results of the study revealed that informal peer group learning is very popular and the assumptions we made through observations can be proved to be true. Then we planned a survey which intend to measure attitudes of students towards informal peer group learning. I got support, advices and guidance from Department of Statistics at University of Colombo and Faculty of Education at University of Colombo on preparing this survey instrument. We conducted a pilot survey and the results and observations of the survey convinced that the instrument should be improved. After making the required improvements to the survey instrument, we conducted the survey and gathered data from the students of University of Colombo School of Computing. We currently planing to extend this study to other faculties. Data coding and analysing is to be done.

Self Evaluation and Progress

National e-Learning Centre (NeLC) at University of Colombo School of Computing (UCSC) provided me with the opportunity to visit Sweden for two months (1st of May 2009 to 2nd of July 2009) to meet relevant people and get feedback on my studies. In Sweden, I met several researchers and they guided me to restructure the research plan and methodologies. In this matter, Dr. Henrik Hansson gave me a great deal of advice and guidance. That was a real good experience that I had working with an experienced social and educational researcher. I also participated in several seminars on relevant studies and made contact with other researchers from several countries. I got the opportunity to participate in a Ph.D licentiate defense and that was also a real good experience for me. I had the opportunity to interview a foreign student and it revealed that, informal peer group learning is also encouraged in foreign countries. However, the settings in which they conduct informal peer group learning is very different from the local settings. Stockholm University offers NeLC masters/Ph.D students a Research Methods course and I decided to follow it. Therefore, the final month of my stay, I spent on reading research methods books recommended and provided by Stockholm University. However, I didn't have the time to complete all compulsory reference material from there. I could only manage to make available the required books for the course in our reference library by the end of October. However, I have submitted the first assignment and other assignments are nearly completed. This course helped me to further improve my research plan and methodologies. Hence, I got the confidence of doing a good quality research to contribute to the community. It should also be mentioned that I have gained a great deal of knowledge on how to conduct surveys of social educational settings, sampling methods, preparation of questions through the help of experts from the Department of Statistics and from the Faculty of Education at University of Colombo. I conducted two survey studies in two different data collection strategies. The first survey was an online survey and the second one is a face-to-face interview type survey. Therefore, I got the experience of conducting surveys in two different ways. When doing research, it is really important to keep the sequence right and act positively. I am satisfied myself as to this point as a researcher because I am progressing to be an experienced researcher.

Working Progress and Plan for 2010

I plan to come up with a working tool by the beginning of February 2010. Initially, I was planning to complete this at the beginning of January. However, I had to give priorities for conducting interviews and surveys. Because, when doing educational research, it is important to synchronize research with the time schedules of academic schedules. I plan to conduct informal peer group assessment from the beginning of next semester to the end of May 2010. I plan to do assessments when students are preparing for their assignments. In addition to that, the literature reveals that formal examinations may not be suitable to assess the informal peer group learning. Therefore, I plan to study student groups which have been grouped by particular subjects for doing assignments and conduct my assessment using those groups. It should also be mentioned that the research work has been slightly moved towards more pedagogical aspects. There are various measures and variables that I have to consider and concentrate on to establish the validity of data we would present and use to come to conclusions. Incorporating and creating a proper design plan is a challenging task. Therefore, I plan to spend a considerable amount of time on designing and planning peer assessment from the beginning of February 2010 and complete it at the beginning of March 2010. My plan is to complete the masters studies at the end of June 2010.

Publications and Other Achievements

I have submitted a paper for the 2nd International Conference on Computer Supported Education and am waiting for comments from the review committee.

Candidate: R.V.S.P.K. Ranatunga

Title: On-line Plagiarism Detection in e-Learning Systems

Progress:

Description: The literature review has been done under several areas of the research.

Some important understanding from entire literature which may be applicable to the research

What is plagiarism?

- “Plagiarism is passing off someone else’s work, whether intentionally or unintentionally, as your own for your own benefit.” (Carroll 2008)
- (Joy et al, 1999) defines plagiarism as “unacknowledged copying of documents or programs”
- unauthorized use or close imitation of the ideas and language/expression of someone else and involves representing their work as your own.” (Hannabuss 2001)
- (Martin 1994) mentions that Plagiarism may occur with several different dimensions such as word-for-word plagiarism, paraphrasing plagiarism, plagiarism of secondary sources, plagiarism of the form of a source, plagiarism of ideas, plagiarism of authorship

Plagiarism detection software and approaches

- Most of the popular commercial plagiarism detection software available in the market and web are reliable, but expensive (Bryan Scaife 2007).
- Scanning the common keywords among the documents is suggested by SCAM tool (Shivakumaran 2003).
- A water mark base approach is proposed in (Hiary 2005) both (Schleimer et al 2003) discusses how document fingerprinting can be used to detect plagiarism.
- Multilevel text compression approach (Manuel et al 2006) is another document similarity approach used for plagiarism detection.
- Natural language processing approaches that have been taken for plagiarism detection are presented in (Maxim et al 2007) , (Chi-Hong Leung et al 2007) , (Michael 2003)

Document representation models and similarity measures

Vector Space Model (VSM) - Vector representation is one of the powerful document representations in a computer. Vector has been made by tokenizing entire document. The vector consists of number of words in a vocabulary of certain language and it is called dimensions. Thus some word has one or more term frequencies and some other has zero term frequency. Cosine is used to normalize and quantify this correlation and if the two vectors are totally in different angle, the correlation between two document get very low and cosine value related to 0. If the angle of the two vectors is identical, it has more correlation and the cosine value is reached to 1(Salton et al 1983).

N-gram Representation

N-gram technique was first used to automatically determine the language of the documents. This technique uses the statistical patterns of letters in the words of a specific language. An n-gram has not linguistic meaning and consists with either character level or word level. (Alberto et al 2009)

The Natural Language Processing Approach

In paraphrasing and collusion the plagiarizer can modify the word order or change the sentence structure (i.e. change voice and tenses) and it changes the surface of the sentence.

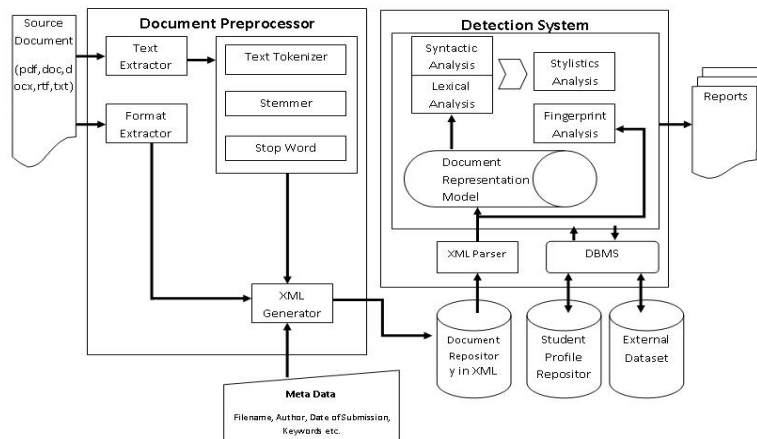
In NLP, case grammar is used to interpret the deep semantic structure of a sentence under the extracted grammatical arrangement of the syntactic processing by the parse tree. The case grammar is based on the verb of the sentence. The verb of a sentence is used to fill other components of the sentence without affecting the real meaning. Information of the parse tree can be used to produce semantic structure completely. (Chi-Hong et al 2007), (Mozgovoy et al 2007), (Noam Chomsky 1953)

Changing the words of a sentence to interpret the same meaning is the most significant nature of the paraphrasing. In order to avoid this situation, the WordNet has given appropriate facilities with large variety of semantic relations such as Synonymy, Antonymy, Hypernym, Hyponymy, Meronymy, Troponymy, Holonym, and Entailment. (George A. Miller 1995)

Authorship Attribution

Every student has their own diverse and individual version of their own idiolect. This large active vocabulary is built up over many years from his or her birth, which will differ from the vocabularies of others. Any writer principally can use any word at any time in their documents. Conversely, they always attempt to use the words from co-selection of their individual vocabulary. This disclosure is possible to be utilized as a signature of an author for detecting authorship of a document or at least can obtain the basic semblance of the authorship. Coulthard (2002)

Proposed architecture of the plagiarism Detection



Implementation of the document preprocessor and proposed algorithms of the above model.

There are several parses for converting documents from Pdf files and Ms Word file to text files have been implemented as PdfParser.java and DocParser.java.

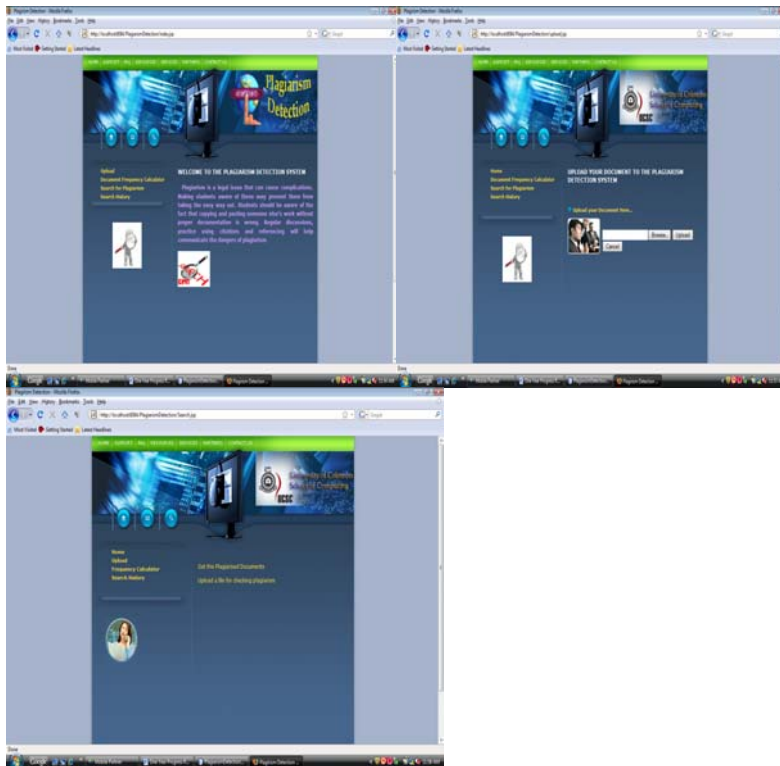
Coded the Document Preprocessor as java classes named FileInverter, which contains doReadFile, doWriteFile, and doWordCount as methods and coded the English Stop Word Remover as java class named StopWordRemover, which contains three overridden version of the method removeStopWord(). The method can be used to return as File, ArrayList or Hashtable. Coded the Stemmer which is another component of the preprocessor as java class named DocumentStemmer, which contains potterStemmer, and lovinsStemmer as the dominant methods and several other assistant methods. This class can handle two stemming algorithms.

Implement the XML generator for extract the XML tags of input file

Following four algorithms have been coded and are being tested on data set which obtained from LMS of UCSC.

- Algorithm on Boolean Model – BooleanModel.java
- Algorithm on Normalized Vector Space Model – VectorSpaceModel.java
- Algorithm on Ngram and Fingerprinting – NgramModel.java
- Document Property analyzing algorithm using normalized vector space model – DocumentPropertyAnalyzer.java

Including the above modules I have coded the plagiarism detection system with the assistance of research assistant, as web application using java script and now it is being tested on LMS data set under UCSC. Following figures show the screen shots of main page and some other pages.



Two months study visit to Sweden from 01st of May 2009 to 30th June, 2009.

Following activities were done during the entire period

- Meetings conducted with several professionals related to my research area especially Prof. Jude Carrol who is a popular for plagiarism in the world.
- Participate seminars and presentations. Especially Prof. Jude Carrol conducted three seminars on plagiarism and I participated those seminars.
- Reading *Research Methodology* (Ph.D Course)
- Under other academic activities, I gained more knowledge and practical aspects from discussions with students and lecturers. Lunch time seminars also one of a good academic activity which I participated there.
- Expose to the academic environment in Sweden

Three coursework completed, that related to the research area

- CS 4019 - Computational Pattern Recognition
- SCS 2009 - Advanced Data Structures & Algorithms
- *Research Methodology* Ph.D Course conducted by DSV, Stockholm University, Sweden.

Publication: Ranatunga RVSPK, Atukorale AS, Hewagamage KPH, *A novel Framework for plagiarism Detection in e-Learning Systems*, e-Asia conference, 2009.

Work plan: I am going to submit the abstract of my second research paper named *Enhance the Plagiarism Detection with Document Property Analyzer* on or before 29th January 2010. Full paper will be submitted on 21st March 2010. Visit to Sweden from 01st February to 31st March. In this visit I hope to conduct several seminars on my research in DSV, Stockholm University. It will be helpful to obtain the ideas and practical issues of the implementation of algorithms from them. Further I am going to

study the plagiarism detection systems which were implemented in Stockholm University and other several universities of Sweden and the policies which were established in such universities for practicing those systems in e-learning environment. Finally I am going to participate to the conference on e-learning on 21st March at Stockholm University.

Implementation of the proposed other algorithms such as using Natural Language Processing and Authorship Attribution are also undertaken simultaneously. Research papers for other modules also will be written and going to be submitted to the international conferences. Testing the pros and cons of the implemented algorithms by using the UCSC dataset. Select the most appropriate algorithms for plagiarism detection system for e-learning system.

Candidate: Enadi Chathuri Upeksha Gunathunga

Title: Study on applicability of e-Learning in the secondary education sector in Sri Lanka

Description:

Followed four subjects and sat for the examinations of four of the subjects of the MIT course in order to earn credits for the Mphil program. Installed moodle and xampp to the local host and linked moodle instances integrates several LMSs. Studied the use of e-learning the secondary education of Sri Lanka. Conducted a workshop to school teachers with 4th year students (on how to use curriki system for secondary education).

- Literature review and analysis the existing systems.
- Linked moodle instances
- Passed MIT3100 Instructional Designing for e-Learning,
- [MIT4080 Evolving Technologies in e-Learning](#), [MIT3090 foundations of e-Learning](#)
- Submitted a paper abstract to e-Asia conference
- Submitted a paper abstract to **ICEL 2010** conference

According to the analyze made during the last 6 month implement the VLE to incorporate the needs required for the secondary education, also needed to test whether this actually supports the needs through testing and evaluations carried out among stakeholders.

Name of the Student	Ms.S.M.Madhavie Malika										
Project Title	Study the Role of the Digital Library in Online Learning										
Brief description of work carried out during the reporting period	<ul style="list-style-type: none"> Followed Master of Information Technology (MIT) semester 01, all 04 subjects and got the eligibility to register for the M.Phil degree <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 60%;">Subjects</th> <th style="text-align: center;">Results</th> </tr> </thead> <tbody> <tr> <td>➤ MIT1010 Program Design and Programming</td> <td style="text-align: center;">C</td> </tr> <tr> <td>➤ MIT1020 Computer Systems</td> <td style="text-align: center;">C+</td> </tr> <tr> <td>➤ MIT1030 Fundamentals of Information Technology</td> <td style="text-align: center;">B-</td> </tr> <tr> <td>➤ MIT1040 System Analysis and Design</td> <td style="text-align: center;">B-</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Literature review on the Digital Libraries (DL) and Learning Management Systems (LMS) Studied the existing DLs and their roles Selected a sample DL (<i>Dspace</i>) and studied its functionality and limitations Installed the selected DL instance (<i>Dspace</i>) with a Moodle instance Studied about integration by reading past research papers (<i>literature review</i>) 	Subjects	Results	➤ MIT1010 Program Design and Programming	C	➤ MIT1020 Computer Systems	C+	➤ MIT1030 Fundamentals of Information Technology	B-	➤ MIT1040 System Analysis and Design	B-
Subjects	Results										
➤ MIT1010 Program Design and Programming	C										
➤ MIT1020 Computer Systems	C+										
➤ MIT1030 Fundamentals of Information Technology	B-										
➤ MIT1040 System Analysis and Design	B-										
Significant result(if any)	<ul style="list-style-type: none"> Installed the selected DL instance (<i>Dspace</i>) with a Moodle instance Still trying to integrate those two instances 										
Significant deviation from original project plan(if any)	<p>Originally planned to integrate DL instance (Dspace) with a Moodle instance at the end of first year (2009).</p> <p>For that purpose, I have installed DSpace in Windows environment, but unable to get a proper functioning DL because of lots of failures.</p> <p>Then again installed the DSpace in Linux environment but still could not able to find a plug-in to integrate DSpace with Moodle under a Linux environment. The main reason for this deviation is that DSpace using a Java server and Postgres database where Moodle use PHP and MySQL database.</p>										
Publications(if any)	—										
Work plan for 2010	<ul style="list-style-type: none"> Follow Master of Information Technology (MIT) semester 03, 02-subjects in e-learning and get credits for the M.Phil degree <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 60%;">Subjects</th> <th style="text-align: center;">54</th> </tr> </thead> <tbody> <tr> <td>➤ MIT3090 foundations of e-Learning</td> <td></td> </tr> <tr> <td>➤ MIT3100 Instructional Design for e-learning</td> <td></td> </tr> </tbody> </table>	Subjects	54	➤ MIT3090 foundations of e-Learning		➤ MIT3100 Instructional Design for e-learning					
Subjects	54										
➤ MIT3090 foundations of e-Learning											
➤ MIT3100 Instructional Design for e-learning											

Name of the student	K D Sandaruwan
Project Title	Computer based ship model to predict real-time ship motion characteristics for perception enhanced virtual environment
Brief description of work carried out during the reporting period	<ol style="list-style-type: none"> 1. Searched reference materials to Study Newtonian/Fluid dynamics for model dynamic rudder, throttle and disturbance forces such as wind and waves in various sea states. 2. Developed 6 degrees of freedom ship model based on our own algorithms and constrains. 3. Simulate the developed 6 degrees of freedom ship model with real time interactions and obtain satisfactory out comes.(By using Mathworks Matlab) 4. Searched reference materials to Study real-time rendering, real-time Panoramic navigation, and real-time tiled display systems. 5. Installed free and open source 3D graphic rendering engines and study their features and performances. 6. Developed panoramic (300⁰ FOV) stitched display system based on <i>Ogre 3D</i> graphic rendering engine. 7. Studied Conventional Maritime Education system and identify critical factors to develop virtual learning and training environment for maritime education which can reduce the total cost of training and increases the quality of training. 8. Fundamental level validation was done to validate the developed ship motion algorithms with respect to benchmark ship trails and obtain satisfactory outcomes.
Publications	<p>25. <i>Real-time Ship Motion Prediction System- Computer Games, Multimedia and Allied Technology 09</i> conference in Singapore ISBN: 978-981-08-3165-3</p> <p>26. <i>Virtual learning and training environment for marine education (2009)</i>27th National Information Technology Conference in Sri Lanka ISBN: 978-955-9155-17-1</p> <p>27. <i>A Ship Simulation System for Maritime Education - e-Asia 2009 Sri Lanka</i> ISBN: 978-955-9021-90-2</p> <p>28. <i>Modeling and Simulation of Environmental</i></p>

	<p><i>Disturbances for Real-time Six Degrees of freedom Ocean Surface Vehicle- Sri Lankan Journal of Physics (Accepted)</i></p> <p>29. <i>Perception Enhanced Virtual Environment for Maritime Applications - Computer Games, Multimedia and Allied Technology 10</i> conference in Singapore (Accepted)</p>
Other achievements	<ol style="list-style-type: none"> 1. "Vidu Sayura" Won National Best e-Content Award "e-Swabhimani 2009" .This is is a Local initiative for selecting and giving national level recognition to a best e-content and applications developed in Sri Lanka. 2. Virtual learning and training environment for marine education (Vidu Sayura) won the Best Poster Presentation award at 27th National Information Technology Conference in Sri Lanka 2009. 3. "Vidu Sayura" research was highly appreciated by His Excellency the Sri Lankan President and also drew tremendous public response at the recent e-Asia 2009 exhibition.
Work plan for the next 12 months period	<ol style="list-style-type: none"> 1. Further Validate the Developed 6 degrees of freedom ship model. 2. Further Develop the current 6 degrees of freedom ship model to simulate latest ocean surface vehicles. 3. Further enhanced the user perception of "Vidu Sayura" with respect to the real world scenario. 4. Further study the teaching and learning aspects of the maritime education. 5. Study visits to get the national and international exposure.

Appendix 1 (1.A4)

SCORM Based Online Assessment Objects for Computing Skill Evaluation

Enosha Hettiarachchi¹ and K.P. Hewagamage²

University of Colombo School of Computing, Colombo, Sri Lanka; email: eno@ucsc.cmb.ac.lk and kph@ucsc.cmb.ac.lk

e-Assessment which is most commonly known as online assessments has become an integral part of e-learning based study programmes offered by educational Institutes. One of the main reasons why educational institutes prefer online assessments is because it facilitates immediate feedback through automated marking permitting the launch of programmes on a mass scale.

Generally, many online assessments are based on true/false or MCQ based approach to automate the marking process. Assessments that can be done using true/false and MCQ are limited to assess different levels of knowledge. It is difficult to assess the skill of doing something. We have found that students with the knowledge may not possess the skill of doing. This was observed when students were asked to carry out different activities using Microsoft Office Package. Therefore assessing the skill level of students is a vital part of certifying them as skilled users of a particular programme. The current method which is used to assess skill is conducted manually as a lab-based assessment where an instructor manually marks the answer files of students. From the perspective of students this method is not very productive as they feel the pressure of physically attending and doing an assessment opposed to doing it online at their own place or at a place where they feel comfortable.

In this paper, we present interactive, assessment objects based on the MS Office package, automated to mark answers of the students. Even though, we developed assessment objects to conduct online skill assessments, they has two perspectives, for use both as an Assessment Object and as a Learning Object. As Learning Objects, students are provided with feedbacks based on their actions, and they are given encouraging guidelines to proceed further. As Assessment Objects, feedback is not given, actions are recorded and scores are based on those actions. Questions for the assessment objects were developed for a course on MS Office package conducted at the UCSC. Our main objective was to produce interactive activates to assess, the students skill level in using tools available with MS Office such as MS Word, Excel and Access packages. Interactive activities were developed by simulating the MS Office package, to give the look and feel of the exact MS Office package. Later these interactive activities were converted into assessments. Assessment objects can be considered as a question bank where several questions are stored and a predefined number of questions are presented dynamically. Each question captures students' interactivity when he/she performs a task and based on the assessment criterion, scores are allocated for that particular question. When a student finishes all the questions given to him/her within a particular attempt, marks obtained by the student are automatically displayed. Therefore students have the facility to obtain immediate feedback. Through the communication carried out between the assessment object and the LMS, statistics such as the results obtained, time spent and status are recorded in the LMS. These statistics can be used by instructors for record keeping purposes. The paper also presents a pilot study carried out with students as well as with teachers after developing the assessment objects and a system evaluation carried out.

Online Approach to Improve Basic Tamil Language Skills

M. Dewasurendra,¹ P.A.S.P. Jayalath² and K.P. Hewagamage³

¹Presidential Secretariat, Colombo 1, Sri Lanka; ²Ministry of Education, Sri Lanka ³University of Colombo School of Computing, Colombo 7, Sri Lanka; email: ¹madhawadew@yahoo.com; ²asp@ucsc.cmb.ac.lk; ³kph@ucsc.cmb.ac.lk

The online teaching learning approach is gaining popularity at present and it has proved to be a cost effective method of delivering learning content using open and distance technologies. Developing learning content has been possible with subject matter experts who are geographically scattered. Thus harnessing the potential of ICT in education has become a popular mode of learning today. In case of language learning, a wide range of basic language skills can be enhanced with the use of Web-based activities.

In terms of the Constitution of Sri Lanka, Sinhala and Tamil are official languages. Although the government has introduced policies such as paying incentives, salary increments and promotions based on skills in the second official language, the number of public servants proficient in Tamil language is still very low.

“The Online Approach to Improve Basic Tamil Language Skills” is an experimental online course designed to access the interactive facilities for the Tamil language learning in Sinhala medium. The target of learner in this course is Sinhala speaking government servants who are not fluent in Tamil, with the intent of promoting better public relations in the government sector and with the end goal of enhancing national harmony. It is generally expected that this type of online program could enhance the quality, efficiency and productivity of public sector in Sri Lanka.

An online course was developed using Moodle, the most popular open source learning management system to deliver it. The course has been named “*භාවිත දෙමළ*” (*Bhavitha Demala*), which means Tamil in practice. The learning materials are comprised with texts, animations, sound clips and video clips. Simple activities and quick feedback methods are used to enhance learners’ enthusiasm. Forum discussions, wikis and a virtual canteen have been made available for improving learner collaboration. Self assessments are provided to improve learning experience. Resource links are also available as additional learner support. Except the default instructions other instructions are in Sinhala text or sounds. The Sinhala medium instruction is given in the course.

This type of a course can be maintained in the server of any public institution could be accessible to public officers through the Internet or Intranet in government offices. Several current government organizations could start such services using their existing IT infrastructure without incurring any additional cost. In this project, the objective is to assess the feasibility of designing and developing online learning activities for Tamil language learning. However, for the a implementation of online course for Tamil language skill enhancements, more work has to be done with respect to both pedagogy and technological issues.

Appendix 1 (1.A5)

Progress Report 2009 – Msc (e-Learning)

Candidate (Student of MSc (e-Learning)): Miss K.M.G.B.Nishakumari
Description:

In 2009, I have completed the final year project of the Msc. in E-learning degree program which is offered by the University of Edinburgh, UK through e-learning. The project was about “exploring the effectiveness of different strategies to motivate students to actively participate in online discussion forums”. This one year research project was based on 2 compulsory courses offered by the UCSC in the third semester for those students who want to follow the e-Learning stream for the Masters of Information Technology (MIT) degree programme. These courses were MIT 3090 “Foundations of e-Learning” (FeL) and MIT 3100 “Instructional Design for e-Learning” (IDL).

The aim of the research is to explore the effectiveness of the new strategies that were introduced into both online courses. Both quantitative and qualitative methods were used to analyse the effectiveness of the new strategies applied in these courses. Student satisfaction and their perceived helpfulness of certain forum activities were considered as proxies for motivation. A comprehensive literature review was conducted to identify several motivational strategies that can be used to motivate the learners to actively participate in online discussions. The course structure and the learning activities were designed and developed using several design strategies applicable for an e-Learning course. The courses were facilitated by a group of instructors. Computer transcripts were analysed to see students’ reactions to the strategies applied in the courses.

The results show that the forum activities should be relevant and meaningful for their needs to motivate students to actively participate in online forum discussions. While emphasizing the importance of the facilitator’s role in discussions, inclusion of varied, challenging and multidimensional activities which promote interaction among students is also important to keep them engaged in discussions. Therefore, it can be seen from this study that certain strategies used in both courses were effective in motivating students to participate in online discussions while some strategies need to be modified to get the maximum effectiveness in using them in these online courses.

Currently I’m planning to graduate in 2010. I have also presented a paper based on my project at the eAsia conference in December.

Nishakumari, K.M.G.B. (2009). *Effective strategies to motivate students in online discussion forums*, paper presented at E-Asia conference, Colombo, 2-4 December. **(Abstract is given below)**

Effective strategies to motivate students in online discussion forums

K.M.G.B. Nishakumari

University of Edinburgh, Scotland, U.K.; email: nkk@ucsc.cmb.ac.lk

Since several e-Learning programmes have been conducted by several institutions in Sri Lanka, it is necessary to investigate motivational factors that affect students' online experience in the local context. Whether intrinsic or extrinsic, student motivation is required to participate in a learning process. An engaged student is intrinsically motivated to learn and will gain greater satisfaction by participating in discussions to learn new competencies rather than to get good grades or teacher acceptance. Stimulating and sustaining learner motivation throughout a course is one of the greatest challenges faced by course providers including instructors. Therefore, it is important to create learning environments by building learning communities that promote student engagement.

Lack of student motivation to actively participate in online courses affects all types of online learning. Therefore, it is required to identify and use different learning strategies in activities to promote motivation for student engagement. By combining online and classroom based instructional methods and techniques, different and challenging learning opportunities can be created. In order to evaluate this observation, a case study was carried out considering two blended learning courses offered in the Masters of Information Technology (MIT) degree program of the University of Colombo School of Computing (UCSC), Sri Lanka.

Community of Practice model called the WisCom model. Different motivational strategies used in promoting active participation in online discussions were identified in the activities designed for both courses mainly based on Beffa-Negrini's theoretical framework which uses Stipek's motivational principles and Keller's ARCS model of instructional design. The online discussion activities given vary based on the nature of task, use of rewards and criteria for evaluation. Several authentic and relevant learning activities with clear instructions were provided in both courses using collaborative learning and problem based learning principles as well.

This paper examines the relationship between the motivational strategies identified in both courses and student engagement in discussion forums. Both quantitative and qualitative methods were used to analyze the effectiveness of the strategies applied in these courses. Analysis of data revealed that all interviewees had no previous experience in participating in online discussions as a student. Although the learner perceptions regarding interaction in discussion forums varied, the result of the study showed that most learners have felt comfortable and satisfied with the course content and the strategies identified in the given online activities in both courses. Certain strategies were effective in motivating students to participate in online discussions while some strategies need to be modified to get the maximum effectiveness in using them in online courses. Other group members' participation in online discussions was highly appreciated by the students while the importance of providing proper facilitation was clearly indicated as well. In any case, there are no quick fixes for improving a blended learning course. Further improvements in designing and delivering suitable online forum activities are also discussed in the paper.

Appendix 1 (1.A6)

m-Learning@UCSC: Extending the e-learning framework based on the mobility

W.M.A.S.B. Wickramasinghe,¹ A. de S. Jayatilaka² and K.P. Hewagamage³

*University of Colombo School of Computing, Colombo, Sri Lanka; email: ¹asangawick@gmail.com;
²asangi234@yahoo.com and ³kph@ucsc.cmb.ac.lk*

This paper describes how e-learning framework has been extended using m-learning facilities at University of Colombo School of Computing (UCSC), Sri Lanka. UCSC has been using e-learning extensively during the past few years for undergraduate and postgraduate degree programs in addition to an on-line certificate program called FIT. Majority of learners who follow these programs have mobile phones, higher than those with laptop/desktop and Internet connection. Therefore, the requirement of accessing the virtual learning environment (VLE) through mobile devices was identified. m-Learning based services was seen as an effective method of increasing the student mobility, interactivity in the learning process and participation in the learning process. This paper discusses the initiative taken to develop a m-learning platform for moodle, the open source learning management system which was used to develop the virtual learning environment of UCSC. The paper presents how Short Message Service (SMS), mobile browsing and mobile application were designed and developed to access learning resources and activities and interact with other users who are facilitating and following on-line courses. UCSC is the pioneering institute in the Sri Lankan education sector in the use of m-Learning, with innovative ideas. The use of SMS in moodle for bidirectional communication with students strongly reflects the uniqueness of this initiative.

SMS functionality could be integrated with moodle to increase interactivity and enhance learning activities. The m-learning environment in UCSC integrates SMS feature with 1) moodle forums and 2) SMS polls. The privileged users are able to send SMS messages to selected user groups. SMS messages integrated with moodle forums play a vital role when an urgent message such as the cancellation of a lecture has to be announced. The SMS messages sent are directly added to the respective news forums and this will be useful for the users without mobile devices and enable users to keep track of sent messages and message senders. The m-learning environment at UCSC provides an opportunity for students to give feedback *via* SMS for both forum posts sent as SMSs and SMS poll questions. The feedback given via SMSs for the forums are shown as replies in the respective news forums in moodle and feedback given for SMS poll questions are presented in graphical format for better analysis. The SMS polls and the forum SMS messages enable students to actively take part in learning activities.

Accessing learning content through mobile devices would contribute to student mobility, efficiency and effectiveness. UCSC has taken two initiatives to grant access to the learning content through mobile devices 1) mobile application 2) mobile web browser. These approaches not only provide the opportunity to access content on-line but also provide an opportunity to contribute to discussion forums, upload assignments and attempt quizzes through mobile devices. This will enable increased mobility and thus improve the interactivity, efficiency and effectiveness of the learning processes.

Collaborative Digital Learning Resource Repository for Secondary Education

P.K.A.T. Ishaka and K.P. Hewagamage

University of Colombo School of Computing, Colombo; email: thiliniishaka@gmail.com and kph@ucsc.cmb.ac.lk

This research introduces a novel concept for Sri Lankan secondary education system based on a learner-centric, open educational architecture that supports conceptual navigation and interactive exploration of an interdisciplinary knowledge landscape from the perspective of inquiry-based learning.

The absence of an appropriate knowledge sharing mechanism causes a problem as knowledge without sharing does not offer any value to the knowledge as well as to the source of that knowledge. There are four types of teachers in the problem domain:

- those with learning resources, knowledge, experience and willing to share them
- those who need learning resources with rich content
- those who can add value to existing resources
- those who can contribute to the creation of resources

Collaboration is the main strategy to break the walls of knowledge sharing, integrations and communication flow of people who are working towards a common goal. Our goal was to develop an online collaborative repository for school teachers to share knowledge for the benefit of secondary level educators. Our objectives were to develop a repository that offers easy access to online quality materials in the three main languages English, Tamil and Sinhala and develop the largest virtual network among Sri Lankan school teachers which facilitates sharing knowledge and views related to secondary education.

The online repository implementation technologies are Java Struts framework, Hibernate backend, MySQL database server, Apache Tomcat server, Apache Maven build tool, XWiki, a wiki based platform and web 2.0 technology concepts. Web 2.0 is characterized as facilitating communication, information sharing, interoperability, user-centered design and collaboration on the World Wide Web. Educators can find and share an abundance of lesson plans, materials, textbooks and worksheets that are far better than current generic worksheet sites on the web. Digital learning resources are not like traditional physical textbooks. They are multi-modal, which means that communication can be made both visually and auditory. They will replace the need for individual teachers spending time re-inventing the wheel for already available lessons and activities and allow teachers to spend more time customizing the available resources according to their needs. This will be valuable in areas where education is not easily affordable providing a cost effective solution supporting the idea of "open source" in education for everyone, minimizing the education divide. It will bring together not only students, teachers, and parents, but the Ministries of Education, curriculum developers and other policy makers as well and provide a digital crossroad for those who want to teach and those who want to learn. Although the research was carried out in the context of the Sri Lankan secondary education system, it is also applicable to any other developing country in the world.