



ICT FOR DEVELOPMENT FORUM 2013

SESSION ON ICT FOR EDUCATION

“IS ICT THE MISSING LINK IN DEVELOPMENT OPERATIONS?”

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EXECUTIVE SUMMARY



FOR DEVELOPMENT FORUM 2013

Is ICT the missing link in development operations?

28 February to 1 March 2013 | ADB Headquarters, Manila



MINISTRY OF STRATEGY
AND FINANCE



Korea Eximbank
THE EXPORT-IMPORT BANK OF KOREA



A session on information and communication technology (ICT) for education was held on the first day of the ICT for Development Forum 2013 from 28 February to 1 March 2013 at the Asian Development Bank (ADB) headquarters in Manila.

There were three speakers during the session: **Gajaraj Dhanarajan**, chair, Board of Governors, Wawasan Open University, Malaysia; **Rabi Karmacharya**, executive director, Open Learning Exchange (OLE) Nepal; and **Chrisan Pereira**, national coordinator consultant for ADB's Learning from e-Learning project in Sri Lanka.

Two panelists from ADB were also present: **Jouko Sarvi**, practice leader for education, Regional and Sustainable Development Department, and **Brian Chin**, social sector specialist, Human and Social Development Division, South Asia Department.

The session was chaired by **Sungsup Ra**, director of Human and Social Development Division, South Asia Department.

In his presentation, **G. Dhanarajan** provided a history of distance education which dates back to the invention of the printing press in Gutenberg during the early 15th century. Over the last 50 years, distance education—particularly in higher education—has gone mainstream and has benefited tens of thousands of people.

Distance education is defined as the delivery of education to students who cannot attend a campus full-time. The learning happens through self-instruction in accordance with the learner's choice of time, place, and pace, often complemented by organized learning support such as tutorials, residential schools, laboratories, and peer learning forums.

Distance education has evolved through generations of change, and new forms are emerging as new technologies become available. It has evolved from first-generation Correspondence Model (print) to fifth-generation Intelligent Flexible Learning Model (e.g., interactive multimedia online, and internet-based resources).

Open Educational Resources (OER) and Massive Open Online Courses (MOOCs), considered the latest (sixth generation) in distance education, are expected to enable open provision of educational resources through ICT, thus changing the nature of “openness” in education.

Distance education, however, has its limitations: (i) quality concerns; (ii) attitude and perception concerns; (iii) economic concerns, because good quality distance education is not cheap at all; (iv) technology deficiency in terms of national infrastructure, availability of appliances, and cost of connectivity; and (v) low completion rates.

These can change in the future with the use of greater and more intelligent technology. Countries such as India, Indonesia, and the Philippines have become more responsive in terms of quality demands and expectations by subjecting open universities to the same regular accreditation systems.

Indonesia and Malaysia are also willing to have recognition systems that give equal status to graduates of distance education programs of universities. The low completion rate may be attributed to the flexibility that allows students to get in and out of the course. Without the pressure to finish their courses, students take more time to graduate. This raises a question on the applicability of completion rate as a performance indicator in distance education.

R. Karmacharya, the second speaker, shared Nepal’s experience in using ICT in education through OLE Nepal. The organization’s first step was to partner with the Department of Education and launch the “one laptop per child” project in 2008.

OLE has also trained about 400 teachers. In order to have a successful ICT-based education program, OLE’s strategy is to work in the areas of (i) digital content, (ii) teacher training and support, (iii) technology and network infrastructure, and (iv) local capacity and community.

ICT in education offers the following key benefits: (i) self-learning; (ii) self-assessment; (iii) creativity and critical thinking, and not just grades; (iv) quality learning materials; (v) accessibility, distribution, adaptation, and localization of digital content; and (vi) updatability of ICT-enabled educational content and materials.

Other areas where ICT can be beneficial include educational administration and records, management, student assessment, and teacher training and professional development.

In general, there are three main challenges in using ICT in education. The first is pedagogical, which involves a fundamental shift in educational paradigm wherein the classroom changes from being teacher-centric to learner-centric. The teacher’s role also changes from being the source of knowledge to being the facilitator in student learning.

The second major challenge is behavioral, which refers to changing the mind-set of teachers, administrators, trainers, curriculum experts, policy makers, and planners on the role of ICT in education.

The third challenge is technical. Connectivity has always been a barrier to fully enhancing ICT for education. Poor infrastructure and low internet penetration make it difficult to maintain connectivity. Other technical issues include maintenance, power supply, and software.

For ICT in education to move ahead, the first action is to outline clear goals that are beyond just putting computers in schools. A plan to achieve these goals should be accompanied by sufficient budget and appropriate capacity building anchored on practice and applying what was learned. It is also important to develop and distribute relevant (e.g., local) digital content, which may be done through public-private partnerships.

A standardized teacher training program regarding ICT for education should be established not as a separate model, but integrated into the whole curriculum and ICT-based education system, as well as in the teacher-education programs in universities. Capacity building has to happen through practice, not just through training.

Good ICT hardware should meet a number of basic criteria, particularly cost and durability. In terms of software, open source should be tapped. Software should be standardized and kept simple for easy maintenance.

An ICT in education unit may be established within the Ministry of Education. Finally, active participation from the public, private, and development sectors is also recommended to create a conducive ecosystem in using ICT in education.

C. Pereira, the third speaker, shared Sri Lanka's experience in implementing the Pre-orientation Programme (POP), an online learning and examination system for state university entrants. The program aims to improve the knowledge and skills of new entrants to universities in ICT and English.

The POP is made possible through the National Online Distance Education Services (NODES), a national infrastructure and network established through the Distance Education Modernization Project.

It is a program designed to support a Sri Lankan new university entrant who is confronted with a daunting change from a school environment to a university environment. During school education, majority of students learn English and ICT as subjects. Most of the subjects at the universities are delivered in English, and ICT is a regular tool for daily learning and activities.

The POP involves a three-step approach to satisfy the requirements of the learners and the university: (i) pretest, (ii) hybrid courses, and (iii) posttest.

It adopts automated processes for administration and monitoring, including online transaction such as registration and videoconference-based training and call center support.

Despite its success, the program needs to address several challenges. Among these are (i) pressures from students for course enrollment, (ii) power and telecommunication infrastructure dependency, (iii) enhancement of program awareness and communication, and (iv) entrants' technology literacy to do the pretest.

The POP will need to continuously improve in terms of implementation and course content.

The strategic steps to sustain and improve the POP include (i) change management and reengineering of the entire system; (ii) NODES to be acquired by relevant government agency for further development and expansion; (iii) high-level tracking and monitoring strategy along with a sustainable model; (iv) maximizing social media, knowledge hubs, and incubator integration, apart from conventional media such as television; (v) strengthening the Content Development Unit with institution's own content for affiliated and demanded university programs; and (vi) collaboration with partner institutions and provision of appropriate support.

FEEDBACK FROM THE PANELISTS

Jouko Sarvi, practice leader for education in ADB's Regional and Sustainable Development Department, made the following observations:

- (i) **Open source.** Trends show that some consider open source as a movement, but it is still developing and has not yet become a structured trend that many had hoped for.
- (ii) **Opportunities for leapfrogging.** With a lot of advancement in ICT as well as development in ICT for education, there are opportunities to leapfrog in a developing country context, but the question remains on whether these opportunities are being maximized.
- (iii) **Disruptive transformation.** It is often mentioned that ICT could lead to disruptive innovations in education, but the real issue is whether the impact of ICT has come to that stage that it has already become disruptive to transform education.
- (iv) **Learner-centered approach.** One of the promises of ICT for education is it being learner-centered, but the issue is whether ICT for education options and strategies remain so much a platform-level issue instead of pedagogical tools.
- (v) **Developing graduates' soft skills.** Can ICT for education, especially with its promise of a more student-centric technology, provide soft skills (e.g., collaboration, critical reasoning, interaction, and the like) needed in the labor market in addition to the usual cognitive skills?
- (vi) **Overcoming barriers to change.** What are the opportunities that technology advancements provide, and how do you cope with organizational and policy barriers, as well as issues on sustainability, administration, human resource capacity, hardware, and financing?
- (vii) **Lowering cost through partnerships.** Partnerships are needed to lower the cost of ICT in education and make it sustainable, especially for a typical developing country where 90% of the education budget goes to the salaries of teachers.

Brian Chin, social sector specialist in ADB's Human and Social Development Division, South Asia Department, emphasized that ICT in education has a place and potential to improve education outcomes for developing members of ADB.

Information and its speedy access and delivery through the internet and other technologies opened up the possibility of a more equitable and inclusive knowledge economy.

Advances in education technology provide new ways to teach, learn, and measure the impact of education.

ADB's South Asia Human and Social Development Division is implementing Learning from e-Learning: Testing Intelligent Learning Systems in South Asia, a technical assistance project that tests the impact of e-learning tools on student learning outcomes. It piloted a computer-aided intelligent learning system that provides supplementary e-learning instruction in mathematics to 8th grade students within the school environment.

This helps teachers and the school system to reduce the financial burden on the parents for external tutoring, and improve the quality of learning.

Overall, the students have responded positively to the program and are enthusiastic about it, especially in learning mathematics. Important challenges have also emerged, providing useful insights on how to strengthen ICT-based and computer-aided learning.

Availability of ICT infrastructure, adequate internet speed, and computer maintenance are still real challenges. Nevertheless, adapting e-learning programs to suit environments where ICT infrastructure is limited is a possibility. This initiative will also identify solutions that work for students in diverse learning environments.

OPEN DISCUSSIONS

During the open discussions, the speakers outlined the following priorities for investments in order for ICT to create impact in improving education.

For Sri Lanka, these include (i) developing university passers' ICT and English skills expansion, (ii) reforming the university curriculum as some still apply outdated technology, and (iii) establishing open and online content platform where universities can share resources with one another.

For Nepal, the priorities are (i) making relevant content for school education through public-private partnerships, (ii) developing teachers to understand this new paradigm of education along the line of university education, and (iii) putting up a challenge or award for developing innovative technology and addressing connectivity and power issues in the mountainous areas.

For Malaysia's ICT in education, the priorities are (i) improving the quality of content (i.e., curriculum design and transformation); (ii) improving assessment and outcome measurements in distance education; and (iii) improving the skills of academic staff and teachers, as there is often a shortfall even in an urbanized environment.

Poor ICT connectivity and lack of skills—from technical to the use of ICT for academic purposes—especially in the rural areas are also important considerations.

B. Chin emphasized that ADB could invest more on quality and culturally relevant content that is aligned with school curricula. This is one of the most important “missing links” in the development of ICT in education that ADB could support.

J. Sarvi responded that ADB has an opportunity to support development of open source, which provides easy access for users and reduces costs. Open source should be more structured so that government can connect and align with their policy development and make it a part of their education landscape.

Secretary Nazrul Islam Khan of the Ministry of Information and Communication Technology in Bangladesh added that ADB can work on areas such as creating resource and value through co-creation and crowdsourcing.

The Chair wrapped up the session with the statement that ICT offers powerful and innovative tools that can change the education sector. The following are three areas that need fundamental change in education:

- (i) **Classrooms.** ICT can help change classroom activities and make classrooms more interactive and learner-centered, allowing students to learn at their own pace and choice.
- (ii) **Investment costs.** ICT can lower investment costs. ICT may be expensive initially but may prove cost effective in the long run especially when technology, such as open source, achieves economies of scale.
- (iii) **Behavior and perception.** ICT can change the behavior and perception as more and more people recognize the value of online learning and how it can transform technical and vocational learning frameworks.





INTRODUCTION

The ICT for Development Forum is an annual activity focused on knowledge sharing in the area of information and communication technology (ICT). The 2-day forum was held from 28 February to 1 March 2013 at the Asian Development Bank (ADB) headquarters in Manila.

Participants from ADB developing members, donor agencies, development partners, and the private sector discussed the various ways to address development issues with the help of ICT. The fourth and last session of the first day was dedicated to ICT for education.

Speakers shared experiences in implementing programs and projects in adopting ICT to improve access to quality education, including challenges and lessons learned.

Opportunities by which ADB can assist developing members in adopting ICT in education were also discussed and explored.

Chaired by **Sungsup Ra**, director, Human and Social Development Division, South Asia Department, the session presented three speakers namely **Gajaraj Dhanarajan**, chair of the Board of Governors of the Wawasan Open University in Malaysia, **Rabi Karmacharya**, executive director of OLE Nepal, and **Chrishan Pereira**, coordinator, Pre-orientation Programme (POP) of the Ministry of Higher Education in Sri Lanka.

Two panelists from ADB were also invited: **Jouko Sarvi**, practice leader for education, Regional and Sustainable Development Department; and **Brian Chin**, social sector specialist, Human and Social Development Division, South Asia Department.

CHAIR:

Sungsup Ra

DIRECTOR, HUMAN AND
SOCIAL DEVELOPMENT DIVISION,
SOUTH ASIA DEPARTMENT



PROCEEDINGS OF THE 4TH SESSION OF THE FIRST DAY:

ICT For Education

The Chair opened the session by emphasizing the opportunities offered by ICT to education. With the daunting and huge challenges in education in terms of access, quality, and efficiency, there is a need for fundamental changes to occur in the education sector.

ICT in education offers a powerful tool to help transform education toward responding to these challenges.

FIRST SPEAKER:**Gajaraj Dhanarajan**CHAIR, BOARD OF GOVERNORS
WAWASAN OPEN UNIVERSITY
MALAYSIA**DISTANCE EDUCATION FOR DEVELOPMENT:
FROM GUTENBERG TO COURSERA****A. Distance Education: Development, Performance, and Value**

Distance education has a history of about 50 years. However, some may claim that it dates back to the invention of the printing press in Gutenberg during the early 15th century.

In the last 50 years, distance education has gone mainstream that hardly any institution (particularly higher education institutions) with a form of campus education does not claim to have a form of distance education. However, this is not necessarily open learning. Distance education has benefited tens of thousands of people; in South Asia alone, all countries have distance education programs.

The Community of Learning describes distance education in the context of development and considers it a valuable tool across a wide range of activities, from farm training and farm management to postgraduation professional development:

“Development depends on the creation, dissemination and application of knowledge by everyone. Community of Learning believes that technology can greatly facilitate these processes. The techniques of open and distance learning give farmers the know-how to improve their livelihoods and rural women the knowledge to raise a healthy family... create communities of practice among teachers and give children access to the best materials... and, e-learning and the knowledge media are gradually enriching the curriculum everywhere.”
(Community of Learning 2005)

Distance education, by definition, is the delivery of education to students who cannot attend a campus full time. The learning happens through self-instruction in accordance with the learner's choice of time, place, and pace. This may be complemented by organized learning support such as tutorials, residential schools, laboratories, and peer learning forums.

Other important terms associated with distance education are

- (i) **Open learning (OL).** It is the foundation philosophy, while distance education is the technique. OL technically means people can learn as long as they have the opportunity to receive such learning. OL can be mediated in regular classrooms or through distance education. The combination of OL and distance learning should become a private, powerful tool in the provision of education. In OL, one may have access to formal learning for a qualification without having to demonstrate prior learning achievements. However, a demonstration may be required to ensure that learners are equipped to meet the challenges of higher-level learning or training.
- (ii) **E-learning.** It is learning through technology and learning in an educational environment mostly delivered through the internet. It has generated other developments such as online learning and virtual learning. E-learning can also take place on or off campus.
- (iii) **Open Educational Resources (OER).** A term that emerged in the last 5–6 years, it is not education per se, but it provides resources for education. OER takes open learning beyond current practices where resources for education are provided in open platforms, and free and unrestricted learning resources are made available by individuals and institutions for reuse, remix, and redistribution.

- (iv) **Massive Open Online Courses (MOOCs).** These courses have made a major appearance in the last 8–9 months, especially in North America. MOOCs are online courses aimed at large-scale participation and open access via the web.

In the last 50 years or so, the practice of distance education has evolved through generations of change. Gradually, as new technology became available, distance education has taken on new forms.

The evolution of distance education is considered to have gone through five generations or models:

- (i) **First generation**—Correspondence Model (print)
- (ii) **Second generation**—Multimedia Model (print, audio, videotape, CAL/CML, interactive video [disc and tape])
- (iii) **Third generation**—Telelearning Model (audioconferencing, videoconferencing, audiographic communication, radio, and TV)
- (iv) **Fourth generation**—Flexible Learning Model (interactive multimedia online, internet access to web resources, computer-mediated communication)
- (v) **Fifth generation**—Intelligent Flexible Learning Model (interactive multimedia online, internet-based resources to web online, computer-mediated communication using automated response systems, campus portal access to institutional processes and resources)

After the third generation, distance education has become more open, easily accessible, and flexible, and is not passive but highly independent and interactive. This development has occurred over the last 20 years. A question here is that whether OER and MOOCs can be considered the sixth generation (Table 1).

Table 1: Fourth and Fifth Generations of Distance Education

Models of Distance Education and Associated Delivery Technologies	Characteristics of Delivery Technologies				
	Time	Place	Place	Highly Refined Materials	Advanced Interactive Delivery
4TH GENERATION					
Flexible Learning Model	YES	YES	YES	YES	YES
Interactive multimedia online	YES	YES	YES	YES	YES
Internet-based access to web resources	YES	YES	YES	YES	YES
Computer-mediated communication					
5TH GENERATION					
Intelligent Flexible Learning Model	YES	YES	YES	YES	YES
Interactive multimedia online	YES	YES	YES	YES	YES
Internet-based resources to web online	YES	YES	YES	YES	YES
Computer-mediated communication using automated response systems	YES	YES	YES	YES	YES
Campus portal access to institutional processes and resources					YES

Source: G. Dhanarajan. 2013. *Distance Education for Development from Gutenberg to Coursera*. Wawasan Open University, Penang.

In South Asia, major providers of distance education are Indira Gandhi National Open University in India with about 2.5 million students and Allama Iqbal Open University in Pakistan with 1.6 million students. Other distance education providers in the region include Bangladesh Open University, Maldives Tertiary Institute for Open Learning, and Virtual University in Pakistan.

In East Asia, the Open University of China, earlier known as China Central Radio and TV University, has about 2.7 million students. In Thailand in Southeast Asia, three notable institutions offer distance education: Sukhothai Thammathirath Open University, Ramkhamhaeng University, and Thailand Cyber University Project. Indonesia has Universitas Terbuka with 646,647 students.

Conventional open universities established in the 1970s offered traditional subjects for diploma, undergraduate, and postgraduate courses. The following are considered higher-level disciplines:

- (i) management;
- (ii) health sciences;
- (iii) hospitality;
- (iv) business (administration, human resources, marketing, sales, logistics);
- (v) financial services (accounting, banking, insurance); and
- (vi) technology (ICT, computing, networks).

Recently, some institutions are also moving toward lower-level disciplines including those relevant for livelihood. They deliver lower-level courses through distance education. The following institutions offer lower-level courses:

- (i) **Yashwantrao Chavan Maharashtra Open University of India.** Gardening, fire and safety engineering management, beauty parlor management, tailoring, domestic wireman, and mobile repair
- (ii) **Indira Gandhi National Open University (India).** Food and nutrition, and guidance and tourism
- (iii) **Bangladesh Open University.** Livestock and poultry, pisciculture and fish processing, education, management, computer science, and youth development
- (iv) **Open University of Sri Lanka.** Preschool education, professional engineering, entrepreneurship, wildlife conservation, and tourism.

At present, there are limitations on the disciplines taught through distance education. The main barrier is a professional accreditation system. For example, getting accreditation for engineering programs delivered through open and distance education is very difficult. This is why there are no undergraduate engineering programs offered through distance education.

Professional accreditation agencies for engineering require students to have highly advanced skills to practice such profession arising from very high level of laboratory and classroom time and interaction with mentors before accepting a degree for professional accreditation. This can, however, change in the future with the use of more intelligent technology.

Other major issues in distance education include

- (i) **Quality concerns.** Distance education is generally considered to be not at par with traditional education delivered through the classroom. Many of the institutions providing distance education will claim that they provide the necessary active support and effective pedagogical practices and, therefore, quality of education is not compromised.

Governments are willing to address these issues. National quality assurance systems and international benchmarkings prompted open universities to become more responsive in terms of quality demands and expectation. Countries such as India, Indonesia, and the Philippines subject open universities to regular accreditation systems.

Malaysia, for example, has a system of equal accreditation for distance education in place. In a recent rating exercise in Malaysia, two open universities were classified as among the top 35 universities, which can help change public perception.

- (ii) **Attitude and perception concerns.** Despite open universities' efforts to improve perception about distance education, there still remains a negative public attitude about its quality. Distance education as a "second chance" is usually considered "second rate." Public perception is sometimes difficult to change. The early days of correspondence education through primary enterprise left a stigma that has not changed for the last 50 years.

However, there is reason to be optimistic: Southeast Asian countries such as Indonesia and Malaysia are willing to have recognition systems that give equal status with graduates of distance education programs of universities.

- (iii) **Economic concerns.** Often, distance education is portrayed to have the economic solution to access to education. It can be argued that distance education is advantageous in terms of economies of scale because it can handle volumes. However, good education requires a lot of investments, especially in course development, production, delivery support, and technologies, in order to maintain its credibility and value.

Many governments, including those in South Asia, do not provide sufficient investments in distance education that its quality actually suffers. Without sufficient resources, institutions cannot function effectively, especially when the student population is large. Good quality distance education, therefore, is not cheap at all.

- (iv) **Technology deficiency.** Technology is widely available nowadays, but deficiencies are equally high in terms of national infrastructure, availability of appliances, and cost of connectivity.

Some middle- and low-income countries, particularly those in South Asia, still have technology deficiencies. This prevents them from maximizing benefits such as greater access to high-quality and effective distance education, which available technologies can provide. Many open universities are trapped within third-generation distance education, while those using the fourth and fifth generations suffer from skills deficiencies of instructors.

- (v) **Low completion rate.** Open universities have only an average of 40%–60% completion rates, while conventional modalities have 90%–95%. This may be attributable to flexibility that allows students to get in and out of the course, depending on the availability of resources and time.

These students are not pressured to finish their courses and therefore take more time to graduate. How can completion rate be applied in these circumstances? Should completion rate, as a performance indicator, be applied in distance education in the same manner as it is used in conventional education?

B. Changing Nature of Openness in Education

Probably the sixth generation of distance education, OER and MOOCs, enable open provision of educational resources through ICTs.

OER is the result of an active international movement for the education resources from open universities to be made available not only to students but to all for either learning purposes or for reusing purposes by teachers.

These resources are available to everyone, under certain licensing regulations and arrangements, with content that is free for reusing, revision, remixing, and redistribution for noncommercial purposes. It means that a teacher can pick the best resources available from the web and adapt it for classroom use.

The global declaration on OER adopted at the United Nations Educational, Scientific and Cultural Organization (UNESCO) in June 2012 urged 180 governments to use it, noting that global knowledge is available at the local level for whoever wants to use it. An undergraduate student spends from \$4,000 to \$5,000 on textbooks, while open textbooks are made more affordable to poor students. OER providers and users include National Programme on Technology Enhanced Learning, Indira Gandhi National Open University, and Open Textbooks.

On the other hand, MOOC is a sophisticated platform created to provide open online course where people interested in a certain topic can participate, collaborate, and engage with other learners. It is not pedagogic. MOOCs are courses designed for easy access (just a click away) after which a completion certificate may be provided. They are available for self-learners, but credits may be obtained from institutions for a fee.

C. Focus on MOOCs: A New Openness

MOOC is “a model for delivering learning content online to any person who wants to take a course, with no limit on attendance” (Educause Library). It is an online phenomenon made possible by (i) social networking facilitation of acknowledged expert(s) in a field of study, (ii) freely accessible online resources, and (iii) hundreds to thousands of registered students. Learners may interact with each other. Some MOOC platforms are initiated by the University of Manitoba, Coursera, and Google Course Builder, among others.

■ Types of MOOCs

- (i) **cMOOCs.** “Connectivist” MOOC is very much embedded in the Connectivist theory of learning. Proposed by Siemens, it contends that knowledge exists all around us and not in any single individual. In a digitized world of networks, the web, and blogs, it recognizes the diminishing half-life of knowledge that gets replenished and refreshed by the learner.
- (ii) **xMOOCs.** The instructor-led courses present organized content in the form of short videos and use automated testing to check learners’ progress. The massive student population does not permit high levels of interaction between learners and instructors although the networked nature of the venture allows peer-to-peer support.

■ Pros and Cons of MOOCs

Some of the advantages presented by MOOCs are the following: (i) it is freely accessible and available courses are presented by world-class experts, (ii) it offers learners with new ways of learning, (iii) it has the capacity to reach tens of thousands of students simultaneously, (iv) it has the potential to improve teaching and learning, and (v) it presents an opportunity for public-private partnerships.

Its disadvantages are as follows: (i) it is limited to higher and continuing professional education, (ii) there are uncertainties about the quality of assessment and obtaining credentials, (iii) it requires a highly developed ICT infrastructure and higher levels of technical skills to effectively participate in the venture, (iv) there are uncertainties about the learning support, and (v) its providers require high tuition cost leading to certification (Table 2).

Table 2: Pros and Cons of Massive Open Online Courses

PROS	CONS
Freely accessible	Limited to higher and continuing professional education
Presently available courses presented by world-class experts	Uncertainties around quality of assessment and credentialing
Presents learners with new ways for and of learning	Requires highly developed information and communication technology infrastructure
Capacity to reach tens of thousands of students simultaneously	Requires higher levels of technical skills to effectively participate in the venture
Peer-to-peer learning is supported	Uncertainties around learning support
Might improve teaching and learning	High costs by present providers for enrollment leading to certification
Opportunities for public-private partnerships	Proprietary platforms (will add to cost)

Source: G. Dhanarajan. 2013. *Distance Education for Development from Gutenberg to Coursera*. Wawasan Open University. Penang.

D. MOOCs: Looking Ahead

Below are some of the views on the future of MOOCs:

- (i) “They are not a revolution. So much of the pedagogy is this presentational, talking heads sort of thing. We’ve been telling ourselves for years we need to get away from that pedagogy, and now here it is slamming back at us again.” D. Laurillard at Online and Open Access Learning: MOOCs, New Pedagogies and Business Models (C. Parr. 2013. Will MOOCs Fail to Give Students Help They Need? *Times Higher Education*. <http://www.timeshighereducation.co.uk/news/will-moocs-fail-to-give-students-help-they-need/2001478.article>).
- (ii) “If you think the target audience for the MOOC you are about to launch could include a lot of inexperienced learners, then as a teacher, as a pedagogue, you have an obligation to provide for them ways in which they can be supported...If you don’t, you are abdicating

your responsibility to the people you are encouraging in – and ethically that is not a good thing to do.” J. Taylor at Online and Open Access Learning: MOOCs, New Pedagogies and Business Models (C. Parr. 2013. Will MOOCs Fail to Give Students Help They Need? *Times Higher Education*. <http://www.timeshighereducation.co.uk/news/will-moocs-fail-to-give-students-help-they-need/2001478.article>).

- (iii) An academic event where “learner registration, for tracking progress and participation (including results from assessments), video/audio streaming and spaces for social networking. All these are nicely engineered to work together, enabling the smooth flow of data across varied applications. This is something that standard learning management systems (LMSs) will not do.” (V. Balaji and A. Kanwar. 2012. *To MOOC or Not to MOOC – That Is the Question*. Commonwealth of Learning Blog. <http://www.col.org/blog/Lists/Posts/Post.aspx?ID=166>)
- (iv) MOOCs increase access to higher education in developing countries: “Elite universities continue to treat MOOCs as a philanthropic form of continuing education, and until these institutions are willing to award credit and degrees for this type of program, we have to believe that they think that this is a second class form of education suitable only for the unwashed masses.”

MOOCs are a revolutionary pedagogy: “They are not... far [they] are based on a very old and outdated behaviorist pedagogy, relying primarily on information transmission, computer marked assignments and peer assessment.”

Computers personalize learning: “No, they don’t. They allow students alternative routes through material and they allow automated feedback but they do not provide a sense of being treated as an individual.” (T. Bates. 2012. *What’s Right and What’s Wrong about Coursera-style MOOCs*. <http://www.tonybates.ca/2012/08/05/whats-right-and-whats-wrong-about-coursera-style-moocs/>).

- (v) The real revolution “...is placing their xMOOCs in the public domain for a worldwide audience will oblige institutions to do more than pay lip service to importance of teaching...” and [at the same time] “...embrace openness...” (J. Daniel. 2012. *Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility*. <http://jime.open.ac.uk/article/view/2012-18/466>).
- (vi) “One of the characteristics of academia is that nobody wants to be left behind. There’s promise here, great potential, but we need more careful research, and there has not been sufficient attention to that, partly because a lot of the people creating these courses are missionaries, and missionaries are not, by and large, interesting in changing their message.” William G. Bowen, a former president of Princeton University (T. Lewin. 2013. *Universities Abroad Join Partnerships on the Web*. <http://www.nytimes.com/2013/02/21/education/universities-abroad-join-mooc-course-projects.html>).

USING ICT TO IMPROVE SCHOOL EDUCATION AND DISTANCE LEARNING: POTENTIAL AND CHALLENGES

R. Karmacharya shared Nepal's experience in using ICT in school education. His organization Open Learning Exchange (OLE) Nepal presently covers 14 districts in Nepal.

A. Background

OLE Nepal was founded in 2007 with the mission to use ICT to improve the quality of education in Nepal's public schools.

Innovations and advancement in technology have captured the imagination of many people including planners, educators, and learners. Recent developments in higher education, such as MOOC and open courses at the university level, have drawn a lot of interest.

However, there is a need to intervene at an earlier stage, before higher education to leverage technology to improve not just the quality, but also to reduce the disparity in quality and access in education. If governments and concerned institutions and organizations do not take steps to address the issue of disparity in the access to quality education now, it will be too late when the divide becomes wider in a few years' time.

OLE is made up of a group of educators, teachers, trainers, curriculum experts, network engineers, and software programmers who share the belief that technology has a critical role to play in improving education. The group's first step was to approach and partner with the Department of Education in Nepal before launching the One Laptop per Child (OLPC) project in 2008.

Aside from distributing laptops, OLPC addressed ways to improve the quality of education through the use of digital learning resources and teacher preparation.

OLE has implemented its programs in 55 public schools in 14 out of 75 districts in Nepal. Learning through computer program has also been implemented in 22 additional schools.

OLE believes that computers are, in the long term, the most cost-effective means to achieve UNESCO's Education for All goals. Though initial costs may appear to be insurmountable, considerations such as decreasing prices and Nepal's widely dispersed population may prove that education through computers is cost-effective in the long run.

OLE also believes that "we learn best when we do." Technology can be leveraged to enable hands-on learning. Children learn best in this way, and starting them early will help establish their enthusiasm for learning. Children love learning but that is not reflected in schools. Starting them to learn with technology in early grades to build the foundation through exploring and mining knowledge will help make them better learners in the future. The content and knowledge should be shared freely for everyone to access in order not to further widen the disparity. Everything that OLE creates is provided free of charge.

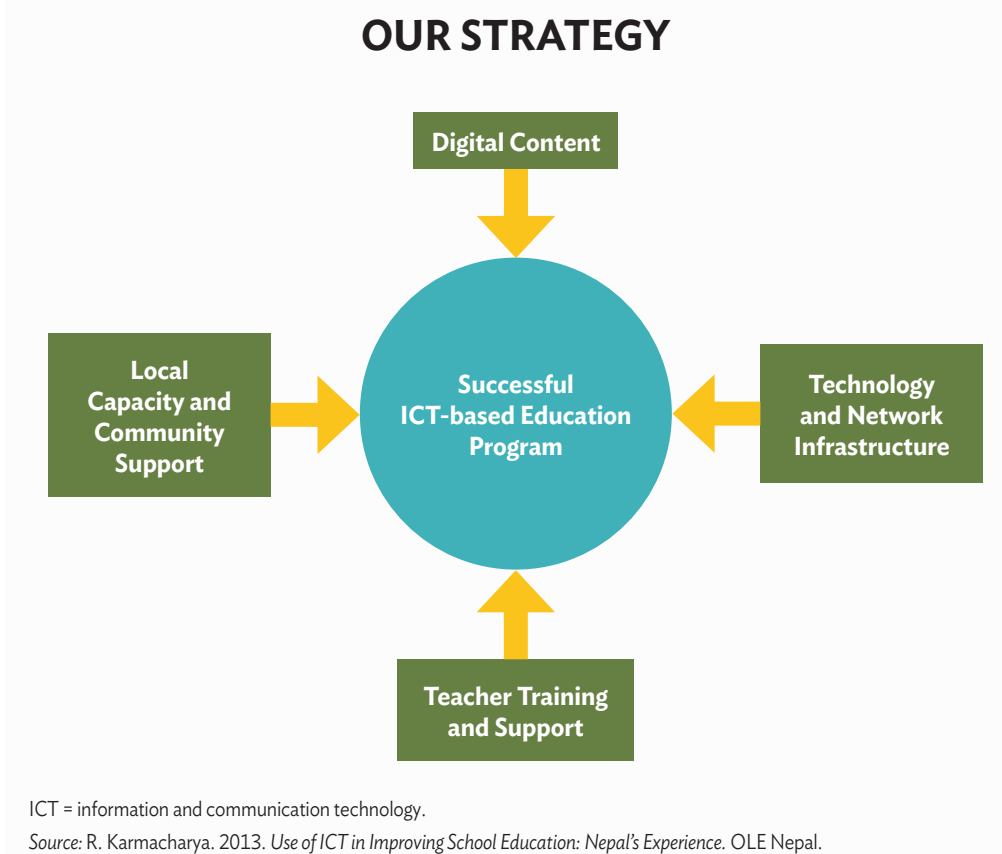
Finally, OLE is mindful that technology will not solve all the problems in education. Other factors such as community participation and capacity building, which OLE has also done, are important. Technology only provides the medium to accelerate other related activities for education.

SECOND SPEAKER:

Rabi Karmacharya

EXECUTIVE DIRECTOR
OLE NEPAL



Figure 1: Open Learning Exchange's Strategy

For a successful ICT-based education program, OLE's strategy is to work in four areas as shown in Figure 1:

- (i) **Digital content.** Some programs merely provide computers in school and hope that children become better learners. However, there is a need for motivation, an enabling environment, and mechanism to make it happen. One of the key components of successful ICT intervention is digital educational content. At the school level, the main consideration is the need of the schoolchildren, and what is it that children need to learn. OLE programs include E-Paath (localized grade and subject specific), which is education content based on Nepal curriculum. There are more than 500 modules to learn English, science, math, and Nepali subjects for grade 2 through grade 6. These are conceptualized and designed by curriculum experts and educators, and the software developer and graphic designer help bring the concepts to life. They include games where children can learn concepts in different subjects. The content is approved by the Curriculum Department Centre of Nepal's Ministry of Education. All of these are free and available online and downloadable from OLE's website. Another program is the E-Pustakalaya, which is a digital library. A server is installed in schools where thousands of books are stored, and children can access them locally even without internet. This virtual library is also available online. It contains dictionaries, maps, videos from Khan Academy, learning games from the British Council and other

sources, put together by OLE with permission from the publishers and sources after a lot of legwork and advocacy for better education of Nepali children.

- (ii) **Teacher training and support.** When content and computers and other devices are put together in school, teachers should be able to use them in teaching and learning practices. Think of the teachers who have never used computers before. The challenge is to ensure that the teachers are prepared with enough skills and confidence to use available technology.

Teachers' capacity development should be supported by the government to ensure that they are empowered to use the technology. OLE advocates for teachers' capacity building beyond information technology (IT) training.

Teacher training support is not just teaching teachers to use computers. The real challenge is getting them to understand how to use this technology in the classroom, how to prepare lesson plans that integrate technology, and how to keep the children's attention and interest in learning.

OLE's role is to make teachers understand how to use technology to promote child-centered, teaching-learning in classrooms, and how to manage classroom effectively and prepare lesson plans that enable integration of technology. The training program also helps teachers become better facilitators in students' learning process.

- (iii) **Technology and network infrastructure.** The choice of appropriate technology for the local context is crucial. Issues such as internet connectivity, school network, and other factors such as the availability of electricity in the localities all need to be considered and worked on. For example, in areas without electricity, if solar power is installed, the challenge is protecting it from being used for other purposes. Community support is also crucial in this area.
- (iv) **Local capacity and community support.** Community support and encouragement is important especially in areas where schoolchildren have never used computers before. OLE's primary objective is not to do its current programs for a long time. Its primary aim is to help make it happen by building the capacity within the government and other concerned agencies in better educating children.

B. ICT in Education: Why and How

The aim of ICT in education is not to displace all modes of learning with ICT. Classroom interactions, project work, and peer learning should continue, and technology should only supplement them.

ICT in education is not meant to replace teachers, but to provide them with additional tools to better facilitate learning. Technology is not meant to isolate students, but to keep them more engaged in the learning process. Technology in education is also aimed at giving more access to learning opportunities.

A lot has changed since the government declared in 1971 that education is a right of every child. Initially, the main concern was on the quantitative side or the access of children to school services. The number of schools has increased from 4,000 to 34,000. Now, the focus should shift to quality education.

The current trend points to decreasing cost of hardware and connectivity, and there are remarkable advances in open source technology. OLE, for instance, uses existing resources

from globally recognized institutions. Noting that traditional approaches have failed to improve quality of education, there is a unique window of opportunity to harness the benefits of ICT in education for countries like Nepal.

Clayton Christensen of the Harvard Business School said, “Disruptive technologies find success initially in markets where the alternative is nothing.” This is the situation in Nepal.

ICT in school education offers the following key benefits:

- (i) **Self-learning.** The child can learn at his or her own pace even at a school setting.
- (ii) **Self-assessment.** The child can assess his or her own progress against a certain competency or learning area.
- (iii) **Creativity and critical thinking.** ICT in education encourages creativity and critical thinking.
- (iv) **More than just grades.** ICT for education promotes enjoyment in learning beyond merely getting better grades in math and English.
- (v) **Quality learning materials.** ICT for education provides equitable opportunity to access quality learning material.
- (vi) **Accessibility, distribution, adaptation, and localization.** Digital content can be easily accessed, distributed, and adapted to local contexts.
- (vii) **Updatability.** ICT-enabled educational content and materials can be easily updated at a low cost.

Other areas where ICT can be beneficial in education include educational administration and records, management, student assessment, and teacher training and professional development.

C. Activities in Nepal

ICT in Education

The following are Nepal’s initiatives with respect to ICT in education:

- (i) Formulation of Master Plan of ICT in Education in 2010 with assistance from UNESCO.
- (ii) Issuance of directive on using ICT in schools in 2012 wherein various committees were assigned tasks toward this end.
- (iii) The Ministry of Education has allocated funds for the past 3 years and distributed computers to schools. Previous efforts in 2010 afforded two computers and one printer each to 3,038 schools.
- (iv) The Laptop Program by OLE, in partnership with the Department of Education, distributed laptops to schoolchildren of 55 schools in 14 districts, modified shared model, and trained about 400 teachers. A qualitative and quantitative evaluation of the program was conducted.

■ Open and Distance Education

Nepal has various experiences in open and distance education. Among these are

- (i) use of radio extensively in teacher training,
- (ii) Master's in Education program on Distance Education as offered by Kathmandu University, and
- (iii) Open University of Nepal, which was introduced in 1999.

However, no substantial progress happened since then. In 2010, Non-Resident Nepalis Association signed an agreement with the government to improve open education.

Deficiency in infrastructure and learners' autonomy are the main challenges encountered during the implementation of open and distance education in Nepal.

D. MOOCs: Global Headlines

Initiatives such as MOOCs are making global headlines, and millions of learners worldwide have signed up. It has captured the imagination of inquisitive learners and is changing the shape of tertiary education.

However, there is much focus on connectivity and mobile devices such as tablets and smartphones. Little attention is given to school education, especially on how to leverage technology to help students become better learners.

Nevertheless, lessons can be derived from the recent success of MOOCs. For example, the content that drives its momentum is lacking in school education. Learners seek knowledge independently, but this is not encouraged in schools where there is a need to guide early learners. Infrastructure and connectivity are the prerequisites for reaching millions of early learners.

The MOOC initiative is driven by well-established, globally recognized institutions, but they do not have counterparts in school education which must rely on actions from governments and other stakeholders.

E. Challenges

Pedagogical. ICT in education is not teaching about computers, but is about using computers for teaching and learning. Various challenges in terms of pedagogy arise from the fundamental shift in educational paradigm wherein the classroom moves from being teacher-centric to learner-centric. Simply put, once students are presented with computers and digital learning resources, they become “engaged” in learning and the classroom becomes student-centric.

The teacher's role has changed from being the source of knowledge to being the facilitator in student learning. ICT in education changes the way we learn. The primary concern is that the students are properly guided so that they can explore, experiment, express, and become better learners.

Behavioral. Another major challenge is changing the mind-set of teachers, administrators, trainers, curriculum experts, policy makers, and planners on the role of ICT in education. ICT-enabled content and the teaching–learning process are considered a disruptive change.

Introducing innovations in the education system takes a long time, and it is not easy. Students comprise the only group that readily adapts to these new methods.

Technical. Connectivity is difficult to establish and even more difficult to maintain. The main technical issues in ICT in education are maintenance, power supply, and software. The problem of connectivity has always been a barrier to fully enhancing ICT in education. Poor infrastructure and low internet penetration rates make it difficult to maintain connectivity.

Moreover, a lack of resources in rural areas makes maintenance difficult. Nonexistent or unstable power supply is another major limitation, and when an alternate source of power is available, the chance of misuse is high (i.e., diverting it from its intended use). Finally, regular software updating, troubleshooting, and localization require a level of expertise.

Administrative and logistics. Policy makers often lack the understanding about the potential of ICT in education. The government generally lacks capacity to plan and execute programs like ICT for education. They think ICT in education is still the domain of IT managers who do not understand education. Government IT staff is often more concerned with hardware and specifications.

Available funds, for example, the Rural Telecom Development Fund, amounting to millions of dollars, are left unused due to lack of coordination between the ministries of science and technology, education, and information on how to work together and use it to make things happen.

F. Looking Ahead

The road ahead requires serious action. First of all, clear goals should be outlined beyond just putting an arbitrary number of computers in schools. ICT in education must be included in national programs and allocate budget for more than computers. A master plan on ICT for education must be formulated with specific action. But beyond the master plan, it is time to take action and go beyond pilots.

It must be implemented accompanied by appropriate capacity building anchored on practice and applying what was learned.

In terms of digital content, it is important to develop and distribute relevant content. Development of digital content may be done through public–private partnership and should also incorporate more local content.

There should also be standardized teacher training programs regarding ICT for education. ICT for education should not be a separate model but should be integrated into the whole curriculum and ICT-based education system. It should be integrated into teacher education programs in universities. Capacity building has to happen through practice, not just through training.

- The focus should not be too much on hardware type. The basic selection criteria for hardware are low cost, low power requirement, and durability. Tablets, for example, are attractive, but they are not the best option available in Nepal.

In terms of software, open source software should be tapped. Piracy should be discouraged. Software should be standardized and kept simple for easy maintenance.

Disruptive change will not be easy. Educators must keep an open mind. Policy makers and planners should approach it with an open mind to overcome the mind-set of controlling information and resources, and embrace open and free access. This should be included in the master programs. An ICT in education unit may be established within the Ministry of Education. This is what donors such as ADB and people advising the government should push for.

The government should invite active participation from the public, private, and development sectors to create an ecosystem in the village on using ICT in education where technology is available from multiple sectors.

The importance of starting early at the school education level should be recognized. It is never too early, and the government should keep investing in the future of our children.

THIRD SPEAKER:

Chrisan Pereira

NATIONAL COORDINATOR
FOR ADB'S LEARNING FROM
E-LEARNING PROJECT
IN SRI LANKA

ONLINE LEARNING AND EXAMINATION SYSTEM FOR STATE UNIVERSITY ENTRANTS' PRE-ORIENTATION PROGRAMME

C. Pereira shared the latest results of Sri Lanka's Online Learning and Examination System for State University Entrants' Pre-orientation Programme (POP), which is an initiative from the Ministry of Higher Education. This aims to improve the knowledge and skills of new entrants to universities in terms of ICT and English.

A. Background

The POP is made possible through the National Online Distance Education Services (NODES), a national infrastructure and network established from the Distance Education Modernization Project (DEMP), which was completed in 2010.

Distance Education Modernization Project

Funded by ADB, the DEMP aimed to develop distance education to expand postsecondary education enrollment in order to develop a modern, high-quality human resources base using latest technologies. Every year, about 100,000 students get selected to study in universities. But Sri Lanka's state universities can only accommodate 20,000–25,000 per year.

To accommodate the 80,000 who qualify but cannot enter the universities, the DEMP was launched to allow students to get qualified and enriched education through distance and online learning platform.

Distance Education Modernization Project components. The project involved three components:

- (i) **Distance Education Partnership Project.** This component focuses on curriculum development, training, research, and content standardization. A national framework for online and distance education was developed and published by the DEMP and the Ministry of Higher Education. It was approved as a recognized qualification framework in higher education institutions.
- (ii) **Public-private partnerships.** The DEMP also developed policy and program to promote private sector participation in postsecondary education in the areas of universal accreditation standards, private participation in online distance education through grants, and scholarships. Grants were provided to partner institutions planning to develop direct online course. About 42 programs were developed. However, there is less success in partnering with private institutions in some programs because of the issue of acceptance of online learning in Sri Lanka. Some partner institutions or grantees pulled out of the system because they could not cope with the set standards.
- (iii) **Capacity enhancement of Open University of Sri Lanka (OUSL).** To modernize OUSL, the key hub of distance education in the country since the 1970s, into world-class standards, the project introduced the following:
 - (a) upgrade of OUSL's central university press, library, and multimedia facilities;
 - (b) effective management information system and cost accounting system;
 - (c) student-centered admission system;
 - (d) modern facilities for educational learning technologies;
 - (e) development of administrative, academic, and technical staff in key areas; and
 - (f) proposal-based upgrading of facilities.

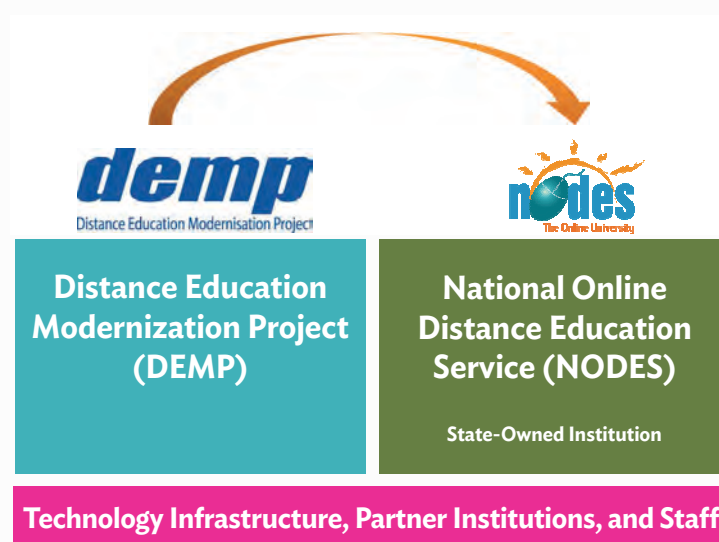
Distance Education Modernization Project infrastructure. The National Distance Education Network was also developed under the project. It is the national infrastructure and network with capacity of simultaneous videoconference connectivity to 550 students. Uniformly distributed within the island covering almost every province, its 26 physical locations or centers have high-speed internet, connected multimedia computers, multimedia projectors, videoconferencing, digital tablets, scanners and printers, separate in-house server with switch rack, centralized uninterruptible power supply, and a generator.

For the first time, high bandwidths for education have been established in Sri Lanka.

Under the DEMP, online and distance education programs and courses were developed by a separate content development unit, providing training and support for partner institutions and other universities. These were enabled by high-end and multimedia computers, laptops and servers, a separate video production center, and supported by instructional designers and multimedia specialists.

National Online Distance Education Service. Following completion of DEMP in 2010, the DEMP concept and management was transferred to a state-owned institution, National Online Distance Education Services (NODES) in 2011. In addition to institutional e-learning support continued from DEMP, NODES facilitated massive public and private initiatives at the national level such as (i) training of 500 media professionals and 100 media societies from Sri Lanka's Department of Government Information; (ii) providing infrastructure support to the Institute of Chartered Accountant's online examination initiative; and (iii) providing national training support and infrastructure to the Union Assurance and Bank of Ceylon.

Figure 2: Distance Education Modernization Project and National Online Distance Education Services



Source: C. Pereira. 2013. *Online Learning and Examination System for State University Entrants' Pre Orientation Programme*. National Online Distance Education Service, Colombo.

Challenges. Despite apparent success, continuing the process (sustainability), maintaining standards, and making a profit-oriented model remain as challenges. Less successful collaborations with partner institutions have led to trials applying different models using the same concept.

■ Pre-orientation Programme for New Entrants to University

After 13 years of school education, a Sri Lankan new university entrant is confronted with a daunting change from school environment to university environment. During school education, majority of students learn in Sinhala or Tamil and learn English as a language subject. Though they also learn ICT as a subject, there is less use of it in daily activities. Overall, conventional communication and less technology characterize regular academic activities.

On the other hand, at the universities, most of the subjects are delivered in English, and ICT is a regular tool for daily learning and activities. Digital communication (e.g., learning management system, forums, e-mail) and the use of technology for academic activities generally describe university life.

The new university entrants are largely characterized by skills and knowledge in English and ICT that do not meet the university expectations or requirements. During the last decades, university students were given various training programs to improve their ICT and English skills.

Students registered with the university system would receive invitations from a number of programs for developing English and ICT skills. But acceptance is very low. Moreover, there were no significant improvements or student enthusiasm toward these courses, since students were given the same curriculum irrespective of their knowledge and skill levels.

Opportunities were not available for the new entrants to map their knowledge level against the university-level expectations in order to identify the knowledge gaps. As a result, students pursue various other educational programs in order to bridge such knowledge gap.

A survey revealed students' feedback that they learn more what they already know than what they do not know. The survey also identified benchmark level for universities for entering qualification for ICT and English. Hence, the POP was born.

The POP is a tailor-made program to enhance university new entrants' ICT and English skills with learner-centered approach. It involves a three-step approach to satisfy learners and university requirements:

- (i) **Pretest.** The first stage is the pretest where the new entrants' knowledge in ICT and English are evaluated and matched with expectations from the university. The minimum university requirements of ICT and English are based on a benchmark system UTEL 4 and Sri Lanka Computer Driving License.
- (ii) **Hybrid courses.** Students who are not competent based on the benchmark undergo training in hybrid mode (both online and classroom or face-to-face sessions). In short, the gaps between actual competency and the university requirements will be bridged by the POP.
- (iii) **Posttest.** In the third stage, the students who underwent actual training will take a posttest to assess their improvement and to reevaluate them against the benchmark system.

The systems adopted for the POP are automated processes for administration and monitoring. These include

- (i) online user registration;
- (ii) online examination center booking;
- (iii) online examination system and demo;
- (iv) online results issuing;
- (v) online training center booking;
- (vi) online certificate printing ;
- (vii) videoconference-based training, location monitoring, and support; and
- (viii) 7 to 7 call center support.

The POP features automated processes for administration and monitoring. The use of 26 NODES centers allowed the following:

- (i) accommodation 15,500 students for one online exam;
- (ii) evaluation and monitoring of entire examination process in real time with videoconferencing (with all 26 centers connected); and
- (iii) provision of education support through web TV and video training materials to trainers and 4,000 registered students.

On top of this, ad hoc visits and physical inspection audits are also conducted.

■ Pre-orientation Programme Success

Success in numbers. More than 75% of the students across Sri Lanka attended the POP, even if it is not mandatory to their university admission.



Source: Media Unit, National Online Distance Education Services. Ministry of Higher Education, Sri Lanka.

For ICT courses, there are 65 centers and 144 assigned trainers. Only 5,267 students scored less than the Sri Lankan computer driving license standards and are required to undergo the training program. However, there are 7,019 registered students, including those who are qualified to skip the training. Therefore, the registration percentage is about 133.3%.

On the other hand, there are about 51 centers and 93 trainers for English orientation course. About 10,161 students scored less marks than UTEL 4 level, but only 9,918 students registered. The registration percentage is about 97.6%.

Success in revenues. NODES was supposed to be backed by central treasury for 2 years. However, with the launch of the POP, it has earned more than SLRe25 million within 6 months. This is in addition to its other regular income. The financial predictions made by the DEMP have become a reality and sustainability is ensured.

■ Challenges Faced during the Project

Challenges encountered during implementation of the POP included pressures from students for course enrollment, power and telecommunication infrastructure dependency, enhancement of program awareness and communication, and entrants' technology literacy to do the pretest.

■ Future of Pre-orientation Programme

Improvement of the POP should be a continuous process. For instance, with the Higher Education for 21st Century under the University Development Grants program, further improvements of the knowledge levels in the course contents are highly imperative.

Starting with the next influx of students, an opportunity to track their progress online will be integrated in the syllabus delivery.

Every university will receive a comprehensive report about their new entrants' level of English and ICT knowledge and the expected capacity development.

The Ministry of Education will be provided a comprehensive report on geographical distribution of ICT and English skill levels average of university new entrants for their future improvement plans.

Pedagogical analysis will summarize the average skill levels of each ICT and English syllabus component for curriculum reforms and teaching technique advancements at the school education level.

The strategic steps that may be necessary to sustain and improve the POP are as follows:

- (i) adopt change management and reengineering of the entire system;
- (ii) enable NODES to be acquired by an appropriate agency from the government (OUSL, University of Colombo School of Computing, or University of Moratuwa) for further development and expansion;
- (iii) develop a high-level tracking and monitoring strategy along with a sustainable model (lack of monitoring and evaluation was one of the core reasons for past failure in the DEMP private partnership);
- (iv) maximize social media, knowledge hubs, and incubator integration, apart from conventional media such as television;
- (v) strengthen the Content Development Unit with institution's own content for affiliated and demanded university programs; and
- (vi) collaborate with partner institutions for provision of appropriate support.

FEEDBACK FROM THE PANELISTS

Open source trend. One interesting issue in ICT is open source and the opportunities it can provide to developing countries. Is it the sixth-generation distance education stage, or is it not? Some consider open source as a movement.

However, while it continues to develop, open source has not become a structured trend as fast as many of us had hoped. Obviously, there are issues such as quality assurance and copyright. Other issues in structure, policy and strategy, and operational environment also contribute to the slow development of open source movement. This is one concern that needs further discussion and analysis.

Opportunities for leapfrogging. Advancements in ICT and developments in ICT for education in recent times have given rise to opportunities to leapfrog in a developing country context. But are the opportunities being maximized? Considering the experiences in Sri Lanka and Nepal, is there a way to further enhance and accelerate leapfrogging for developing countries?

Disruptive transformation. It is often mentioned that ICT for education could lead to disruptive innovation in education. Has the impact of ICT come to that stage that it has already become disruptive to transform education?

Learner-centered approach. One of the promises of ICT for education is its being learner centered and that it can serve students with different learning needs or need different ways of learning. Is ICT in education still a monolith technology reinforcing teacher-centered pedagogy? As mentioned earlier, Massive Open Online Course (MOOC) is a platform rather than a pedagogical tool. But are ICT for education options and strategies remain so much a platform-level issue instead of pedagogical tools?

Developing graduates' soft skills. There is a recognized widening gap between labor market needs and skills of graduates. What can ICT for education, especially with its more student-centric technology, offer in terms of providing skills in collaboration, critical reasoning, interaction, and the like?

These are soft skills needed in the labor market in addition to the usual cognitive skills. How do we further enhance ICT for education to move from the assembly-factory-line approach in schools to learning models that help graduates develop new types of skills?

Overcoming barriers to change. What are the opportunities that technology advancements provide, and how do we cope with the barriers to change such as organizational and policy barriers?

Take for example the local context on barriers and challenges shared in the case of Sri Lanka and Nepal. ADB must look at issues such as sustainability, administrative concerns, human resource capacity, hardware, and financing aspects. Ministries of education still tend to underestimate the total cost of ownership of ICT for education.

Lowering the cost through partnerships. There are innovative models such as the One Laptop per Child (OLPC) project. But from a financial perspective, 90% of a typical developing country's education budget goes to salaries of teachers. The remaining 5%–10%, for example, may be translated into \$10 per child per year.

Jouko Sarvi

PRACTICE LEADER FOR
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Even the OLPC and similar movements have not gotten the price low enough because the economies of scale have not been achieved yet. Therefore, partnerships are needed to lower the cost and make it sustainable. Public-private partnership is a good approach. There is a need for more robust approach in partnerships for enhancing the ICT for education to its next stage where it can really be transformative and have a real impact on improving education.



Brian Chin

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ICT in education has a place and can be a boon in improving education outcomes in ADB's developing members where education resources are limited and quality of even in-person teaching is quite poor.

Online courses such as MOOCs may provide real alternatives for students who are unable to attend a brick-and-mortar university for 4 or more years. In addition, new online learning models are brimming from startups and top universities, bridging the educational divide through video content, MOOCs, open courseware, Coursera, edX, Khan Academy, and so on.

Information and its speedy access and delivery through the internet and other technology opened up the possibility of a more equitable and inclusive knowledge economy. This divide that was a concern a decade ago is now being bridged by smartphones, tablet-like devices, and cheaper information and communication services. These tools are bridging classrooms around the world and changing perceptions of where and what learning can be.

For example, **R. Karmacharya** shared achievements in Nepal with the OLPC and development of open source quality education content that is integrated into the curriculum.

We are in the midst of a revolution that can bring high-quality education to millions of people who never had access to this level of learning before. In Sri Lanka, **C. Pereira** highlighted the accomplishments of the DEMP and the promising results of the study on IT literacy from the POP for new university entrants some of whom may have never used a computer before arriving in university.

G. Dhanarajan cautions the long-term implication of MOOC, if it is not well understood. MOOCs and distance learning courses that are simple substitutes for in-person lectures may not offer a huge value addition that this medium is capable, but the transaction costs are certainly reduced.

Advances in education technology provide new ways to teach, to learn, and to measure the impact of education.

ADB's South Asia Human and Social Development Division is implementing Learning from e-Learning: Testing Intelligent Learning Systems in South Asia, a technical assistance project. This is an innovative pilot that tests the impact of e-learning tools on student learning outcomes and documenting best practices.

The first stage was implemented last year in collaboration with the Ministry of Education in Sri Lanka. It piloted a computer-aided intelligent learning system that provides supplementary e-learning instruction in mathematics to 8th grade students within the school environment.

This helps teachers and the school system to reduce the financial burden on the parents for external tutoring and to improve the quality of learning.

Interesting results came from the initial analysis. An assessment of 200 students from the first 12-week term shows an improvement of around 0.4 standard deviations for the treatment group compared with the control group.

Overall, the students have responded positively to the program and are very enthusiastic about it, especially on learning mathematics. Important challenges have also emerged, providing useful insights on how to strengthen ICT-based and computer-aided learning.

Availability of ICT infrastructure, adequate internet speed, and computer maintenance are still real challenges. Nevertheless, adapting e-learning programs to suit environments where ICT infrastructure is limited is possible, and this initiative will also identify solutions that work for students in diverse learning environments.



Question from a representative from India addressed to G. Dhanarajan:

Most employers in India don't take graduates of distance learning seriously because the courses are easy to pass and teacher-student interface is hardly there, except for some contact classes. Do you think making the courses very tough to pass is going to improve the perception of distance education, as far as employability is concerned?

Response from G. Dhanarajan:

People in India may have a low perception of distance education partly because, historically, the way India conducted its distance education programs—which was based mostly on correspondence—has left a stigma on the entire practice.

Many traditional universities continue to do that. They may not be cutting corners in developing and producing contents, but they are certainly cutting corners in terms of supporting learners effectively and in conducting assessments.

That will not be resolved until India takes control of the quality that is required to maintain and manage good distance education practices. Making exams tough is more of a failure than a success. Making learning interesting enough so that the desired outcome is achieved may guarantee success.

In Malaysia, the quality of all institutions, both traditional or open, are very vigorously managed by the Malaysian Qualification Agency to the point that graduates coming from any of these institutions are measured on their own rather than through a particular mode of delivery of education.

I think policy engagement by government and the quality assurance agencies will perhaps help India improve the performance of correspondence in distance education and, over time, the perceptions of people.

Question from the Chair addressed to the three speakers:

If I provide you with \$50 million, what would be your top three investment areas to improve ICT in education?

Pereira: In Sri Lankan perspective, the skills of university graduates in ICT and English are not at par with industry standards or employer's expectations. Investment in ICT for education should focus on (i) developing university passers' ICT and English skills expansion; (ii) reforming the university curriculum as some still apply outdated technology; and (iii) establishing open and online content platform where universities can share resources with one another.

Karmacharya: Investment priorities in Nepal would be on (i) making relevant content for school education through public-private partnership; (ii) along the line of university education, developing teachers to understand this new paradigm of education; (iii) putting up a challenge or award for developing innovative technology; and (iv) addressing connectivity and power issues in the mountainous areas.

Dhanarajan: Priorities on investment in ICT for education should be on (i) improving the quality of content (i.e., curriculum design and transformation); (ii) improving assessment and outcome measurements in distance education; and (iii) improving the skills of academic staff and teachers even in an urbanized environment. It should also be considered that in many of the rural areas, ICT connectivity and skills—from technical to the use of ICT for academic purposes—are poor.

Question by the Chair addressed to the panelists:

What are the most important missing links in the development of ICT in education which ADB should support?

Chin: ADB is beginning to invest in quality and culturally relevant content that is matched to the curriculum of schools. One of the areas that the ADB technical assistance project Learning from e-Learning: Testing Intelligent Learning Systems in South Asia is working on is assessing the effectiveness of content, and seeing how it can be scaled up to regional and national levels.

Sarvi: There is an opportunity to support open source material stage. It provides easy access for users and it reduces costs. ADB can play a role in helping the sixth-generation stage to become more developed and structured so that government can link that with their policy development and make it a part of their education landscape. In connection to this, increasingly, education should prepare students to learn, not only something static or cognitive knowledge, but also skills that prepare them for their lifelong learning.

Secretary Nazrul Islam Khan, Ministry of Information and Communication Technology, Bangladesh: Without ICT, there is little scope on networking. Network is content, industry, teachers, students, and even guardians. ICT can work anytime, anywhere in any device. ICT can create a lot of resource and value through co-creation and crowd sourcing. ADB can work on these areas.

Wrap-up by the Chair:

ICT offers powerful and innovative tools that can catalyze fundamental change in the education sector. Three areas of fundamental changes needed in education that ICT can help:

- (i) **Classroom activities.** ICT can help make classrooms more interactive and learner-centered so that students can learn in their own pace and choice. ICT can also provide digital content that can capture the diverse requirements of different students and learners.
- (ii) **Investment costs.** ICT can be initially expensive but, in the long run, when technology such as open source achieves economies of scale, cost is reduced. After a big investment at the start, ICT can actually become more cost-effective. Investments also include teacher capacity enhancement and awareness-building among policy makers, and even the teachers, so that ICT for education gets total support.
- (iii) **Behavior and perception.** People need to start recognizing the value of online learning. The formal system should recognize the various ways of learning and that online learning can also transform technical and vocational learning frameworks.

ICT for Development Forum 2013
Session on ICT for Education
“Is ICT the Missing Link in Development Operations?”

The ICT for Development Forum is an annual activity focused on knowledge sharing in the area of information and communication technology (ICT). This report, based on the forum held from 28 February to 1 March 2013 at the Asian Development Bank (ADB), attempts to gauge the impact of ICT on today's learning paradigms. What are the impacts of ICT developments on today's students and teachers? How is distance education changing the way education is being delivered? How is ADB helping developing members take advantage of ICT for education? How are massively open online courses and other disruptive learning paradigms affecting education? These are some of the questions tackled by experts from different countries and from ADB, and this report is the result of that discussion.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to the majority of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

