Chapter 23

An Overview of Innovations in Online Learning

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Learning today has extended much further, beyond the classroom. With the rise of the Internet and mobile phone technology, more education and learning occur online—on laptop computers, tablets, and mobile phones. In 2019, for example, more than 3.9 billion people globally had access to the Internet, out of the world's total population of 7.6 billion, of whom about 3.4 billion were active users of social media such as Facebook and Twitter. These technology developments have dramatically increased access to learning materials and are changing the landscape of education.

This overview article describes the emerging trends in e-learning and blended learning, captures key emerging good practices worldwide, and considers their role in schools and at work, in continuing education, and in workforce skills development.

The most obvious feature of online-based courses is the availability to everyone with Internet access. Individuals are free to join, interact, and reflect based on their learning needs, with students joining with great frequency. Enrollments tend to be high. In the very early case of a class on 'introduction to artificial intelligence' (a noncredit course offered free to anyone) at Stanford University in 2011, 160,000 students enrolled. Utilizing a course Web home and a customized learning management system, the course included lectures, homework, and assessment. While many

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¹Class Central (2018).

Better retention occurs when mobile learning is presented as a stand-alone delivery method or as part of a blended learning program. For example, one global pharmaceutical company achieved a 53 percent improvement in knowledge retention among staff members by using mobile learning to introduce a new product (Werner & da Gama 2011) – Benefits of Mobile Learning, 2015, Lynda.com, LinkedIn Learning.

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online students did not finish the course, some performed as well on the assignments and examinations as did those taking the traditional campus-based course. By 2018, more than 101 million users had participated in Massive Open Online Courses (MOOCs) in over 190 countries on major platforms such as Coursera, EdX, Udacity, and FutureLearn.¹

Challenges in Education Addressed by Online Courses

Traditional colleges and universities are facing a number of issues, including increasing tuition, reduced state support for public institutions, declining endowments, decreasing enrollments, and increasing competition from for-profit institutions. In developing countries, postsecondary education is unaffordable for the majority of the population, and access especially for the poorest is a huge issue.

New online courses can attract millions of participants from around the world, with students openly sharing their expertise and knowledge with each other, while also managing their own learning paths.

Blended learning describes the way e-learning is being combined with traditional classroom methods to create a new hybrid teaching methodology. A course created following a blended learning model uses classroom time for activities that benefit most learners from direct interaction. Traditional education tends to place an emphasis on delivering materials by way of lectures; while in a blended learning model, lectures can be videoed and prepared ahead of time so students can watch at their own time of choosing. Classroom time is then spent doing exercises that emphasize the application of the curriculum, or to solve problems. The new technology allows for individual assessments, and thus learning is personalized.

Promising Online Learning Technologies: Key Trends Worldwide

The Rise of Massive Open Online Courses (MOOCs)

A MOOC is a type of online course aimed at large-scale participation and open access via the web. Early applications of online learning emerged from the availability of content from open education resources (OERs). Though the design of and participation in online courses may be similar to college or university courses, MOOCs typically do not offer credits awarded to paying students at schools. However, assessment of learning may be done for certification.

A MOOC is a model for delivering learning content online to anyone who wants to take a course. Anyone can enroll, and there are no preconditions for participation. It is an interactive, step-by-step course aimed at reaching virtually unlimited numbers of participants, worldwide. The initial courses had enrollments as large as 100,000 students at a time for a course, available worldwide. MOOCs started as free courses

but have now become a ‘freemium’, where some are free and others are for a fee. The first MOOCs were essentially college courses put online: they were approximately 10 weeks long and had weekly or biweekly assignment deadlines, with a final exam. Like a college course, they followed a semester pattern and were offered once or twice a year.

While MOOCs started around 2008, the rapid increase in enrollments began around 2012 with the offering of platforms by Silicon Valley-based platforms Coursera and Udacity, EdX in Massachusetts, and FutureLearn in the United Kingdom (UK). Working with high-quality academic institutions worldwide, including Stanford University, the Massachusetts Institute of Technology (MIT), and thousands of others, these platforms expanded and reached a significant number of users in all countries. Registered users of the largest platform today, Coursera, rose from a few hundred thousand in 2012 to around 40 million in 2018, as it increased its collegiate courses offerings to more than 2,100 from partner universities and institutions across 29 countries. Beyond the United States and Europe, MOOCs have spread worldwide. *IndonesiaX*, for instance, was created for Indonesian students so that courses from the best universities in the world could be delivered in local language as well, taking advantage of the fact that Indonesia is one of the world’s largest users of the Internet (Pandjaitan 2017). The People’s Republic of China (PRC) has also moved quickly since 2013, and (in fact) the development of online courses has put the PRC next to the United States in terms of the growth of users and platforms (Tang 2015).

The originators of MOOCs expected the large uptake of courses to come from the student (high school and college) market. To their surprise, the early users were significantly different. For example, Coursera’s review showed that the principal users were not students in their late teens to early 20s, but rather users in their mid-20s-50s, and 80% already had bachelor’s degrees or were professionals and mid-career workers. These learners were basically enrichment-learners, technical skill builders, and career-changers who needed new skills to advance their careers.

The growth in the first 3 years of MOOCs worldwide was explosive—by 2016, a total of 58 million students, with over 700 universities as partners worldwide, and 6,850 collegiate courses being offered through platforms. These spanned the globe in terms of more than 190 countries, with one-third of all enrollment being from the United States/Canada, another third from the developed economies (such as Europe), and another third from emerging economies (Brazil, PRC, India, and countries in Southeast Asia).

The Pivot of Online Learning to Specialization, Digital Credentialing, and Accreditation

Between 2012 and 2015, online learning dramatically increased, driven by large exponential growth in Coursera, EdX, and other platforms, and was thus initially heralded as a revolution in access to tertiary education. However, early results indicate that, while enrollment was very high, the percentage of those who complete the courses was less than 15%, and the initial assessment of the users of Coursera shows

that users were not college-age students but mostly those who already had bachelor's degrees (Chen et al. 2015).

As a consequence, the main platform providers started to pivot around 2014 and 2015 and repackaged their offerings. Courses began to be offered on a continuous basis and were not defined by schedule dates and thus were more spread through the calendar year. The bunching of students/users into large numbers is now more spread out throughout the year, with lesser number of users per course cohort. In response to market demand, online providers began to offer new kinds of specializations in addition to random courses. Each specialization usually comprises a collection of three or more courses packaged as a specialization, a microdegree, or a nanodegree in specialized skills demanded by new occupations and jobs in the labor market.

Coursera, for instance, offers a specialization in data science, with 10 courses bundled and delivered in partnership with professors from Johns Hopkins University; a specialization in project management principles with the University of California, Irvine; a 6-course specialization in digital marketing through the University of Illinois at Urbana-Champaign; and a 6-course specialization in full-stack web development with the Hong Kong University of Science and Technology. At completion, the users are awarded a specialization certificate for these programs for a fee. And, in keeping with these trends, these new forms of skills acquired online are now codified as digital badges which have become part of an individual learner's portfolio which employers recognize. Consequently, the individual learners credentials in the form of digital badges are appearing in individual LinkedIn profiles. More recently, these digital credentials have earned increase in trust by employers, the government, and the public arising from new digitalization using blockchain where issuers are transparently identified and cryptographically protected.

The EdX platform similarly offered a micromasters program with a collection of courses organized as a specialized job stream, and credit-eligible courses recognized by industry. Examples of these include a micromasters program in cybersecurity with the Rochester Institute of Technology, a supply chain management micromasters credential with MIT, and an international law micromasters program with Catholic University of Louvain in Belgium.

Udacity was among the first platforms to pivot toward specializations or job skill streams in collaboration with large private industry, beginning with the technology firms in Silicon Valley.

Rapid Growth of e-Learning Markets and Investments Worldwide

The emergence of Massive Open Online Courses (MOOCs) was accompanied by the rise of the generic e-learning market and has grown even more dramatically over the last 10 years. The e-learning market caters to various end-users—including skills development and self-improvement markets—which target the corporate learning market, consumer skills market, and the education market. Thus, new content platforms such as Udemy, and other key players including LinkedIn Learning, Pearson Education, Macmillan Learning, and Skillsoft, have been growing at a rapid pace.

Microlearning: Just-In-Time Knowledge and Explosion of Mobile Learning

The latest trend in e-learning is microlearning which is a bite-sized learning nugget intended to meet a specific learning outcome in 4–7 min or shorter to encourage course completion and promote better retention of the learning material. Ideal for learners with low attention span, it is easily accessible via mobile devices, providing just-in-time performance support.

Microlearning arose from the rapid rate of technological innovations, which required an adaptive workforce who can learn quickly and on the go. Studies at Deloitte (2016) indicate that 70% of modern learners rely on search engines like Google, and thus the workforce today, especially the millennials, are naturally learning online already for their job or school needs. Mobile microlearning platforms such as Gnowbe, Axonify, Grovo and others have short courses packaged to address specific just-in-time knowledge needs, have become the trend.

Gerudio (Australia/United States) supports coding boot camps in Australia, India, the Philippines, and the United States and creates software development projects using blockchain technology (Raman Nambiar 2017). A coding boot camp is a super-intensive style of learning programming and is highly project based. Students learn from people coming out from industry and acting as facilitators, and thus students learn the latest technology available.

Use of Online Learning Technologies at the Kindergarten to Grade 12 (K–12) School Level

At the school level (K–12) online learning technologies have been successfully piloted and implemented in many parts of Asia. For instance, to increase student motivation and break the cycle of rote learning, BYJU in India developed a personalized learning app for K–12 students. Studies show that students achieve greater academic progress in schools using personalized learning strategies. An estimated 16 million students are learning this way. To verify content quality, experts in their respective fields collaborated to structure the pedagogy of each subject. Gamified content is used to promote student engagement and encourage increased hours of learning. Increased student engagement has also encouraged greater student efforts, which leads to more hours of learning using the app.

In mathematics learning, *MathCloud's* neural adaptive learning programs are based on an understanding of how the brain recognizes and processes information. Studies have revealed positive impacts in student achievement in ADB's pilot programs.² In Sri Lanka, student achievement improved by 0.4 standard deviation, and reinforced learning using Khan Academy video tutorials helped increase students' standardized test scores by 0.21 standard deviation above the mean.

Deploying Online Learning to Offline Communities

An estimated 4.5 billion people are currently left out, having no access to the Internet. This also means no access to learning opportunities or access to the benefits

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²Asian Development Bank. Completion Report. Learning from e-learning: Testing Intelligent Learning Systems in South Asian Countries 2018.

of a thriving digital economy. Learning Equality was created in 2012 as a social impact initiative, committed to digitally bridging the gap in education by providing open educational resources around the globe through low-bandwidth and offline channels.³ Evaluation studies have revealed positive outcomes in student learning in low-resource communities where Learning Equality's technology was used. In Guatemala, an independent evaluation found that student mathematics performance using Khan Academy content increased an average of 10 points in math scores compared with the traditional program.⁴

Implications for Asia and the Pacific

Rather than replacing existing bricks and mortar classrooms, e-learning has so far been used to supplement and enhance current learning and education even in the countries where these started, notably in the United States and Europe. For some of the younger workers, especially the millennial generation (21–34 years old), e-learning has become the modality of choice to improve their careers. There are a lot more ways to go before a wider penetration of e-learning could be realistically achieved in education in Asia and the Pacific especially for the K–12 and higher education segments.

Moving forward, some pathways are discussed below, to leverage available technologies to achieve improved learning outcomes, gain better skills, and support the overall economic development of the region.

Multilateral and ADB Support for e-Learning Initiatives in Asia and the Pacific

Countries in the Asian Region like the PRC, India, Indonesia, the Republic of Korea, and the Philippines have mainstreamed or incorporated e-learning in their programs and curricula. International multilateral support for these initiatives is critical in initiating wider use of e-learning in schools. For example, ADB can include components in its current and future portfolio of education and skills development projects to test the new methods. The initiation of new e-learning approaches can be scaled up after successful pilot testing, with adequate technical support and resources provided to help schools and administrators.

Addressing the Broadband Issue to Reach More e-Learning Users

A major constraint in developing countries is poor connectivity and the cost of data. Online learning uses video and interactive programming, and this requires more bandwidth, which means additional cost to the users. The increased use of wi-fi technology and making it more available, especially in schools and other strategic locations, can help alleviate the problem.

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³https://www.vodafone.com/content/dam/vodafone/connectededucation/vodafone_connected_education.pdf.

⁴https://learningequality.org/media/FUNSEPA_Final_Evaluation_Report_27May2016.pdf.

Piloting and Scaling-Up Promising Interventions: Understanding Impacts in Various Country Environments

As a new technology, there is a need to understand the impact of specific e-learning interventions before launching these into a wider program. The way these programs impact on learning varies dramatically from one environment to the next, largely because there are program requisites that are addressed differently across countries. Countries in the region need to carry out evaluations through the help of international assistance from such as ADB and bilateral partner agencies.

Localizing e-Learning Courses

Context-and country-specific adaptation of courses is essential to create locally relevant content. IndonesiaX.org is a platform for e-learning initiated in Jakarta, and has localized courses for the Indonesian environment. This is one avenue for responding to national need without necessarily using courses originating from the developed world. It was initiated in Indonesia using Indonesian instructors and loaded unto the EdX online platform. Its initial success in generating interest within the country will provide new avenues to begin e-learning, which was found to be helpful in gaining educational access, particularly for geographically dispersed countries and island economies. Several countries such as the PRC, India, Pakistan, and the Philippines have begun organizing e-learning platforms, which are gaining traction. In the Philippines, for example, online programs were developed that improve Technical and Vocational Education and Training (TVET) skills and address the needs of the high-demand business process outsourcing market, which is one of the growing sectors in the economy.

Innovations in e-learning and blended learning provide new opportunities for the Asia and Pacific region as countries modernize their education, training, and skills development sectors. There is an unmistakable need to incorporate these new technologies in the drive for universal access, and in enhancing the quality and relevance of education and training in these countries.

Link to presentation material: <https://events.development.asia/materials/20160919/overview-innovations-elearning-and-blended-learning>.

Further Reading

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