

An International Perspective of K-12 Online Learning:
A Summary of the 2006 NACOL International E-Learning Survey

Research and Writing by
Allison Powell and Susan Patrick
North American Council for Online Learning

November 2006

We would like to thank the e-Learning leaders and the Ministries of Education for their participation in the first North American Council for Online Learning International Questionnaire. Without their help, this summary would not be possible.

Colin Gould - New South Wales, Australia

Gerry White, Garry Putland, Kathy Moyle, and Roger Edmonds – South Australia

Rob Gilmour and Dr. Rosina Smith – Ontario, Canada

Robert Bibeau, Beverly White, Christaiane Dufour, Margaret Dupuis, Pierre Drouin, and Robert Rochon – Quebec, Canada

Dr. Ji Yongping - China CK CHOI (Mr.) – Hong Kong

Maryam Mokhtarihasanabad - Iran

Ikuya MURATA - Japan

Aitymov Zhandos – Kazakhstan

Rojanth Pande – Nepal

Murray Brown and Peter Guiney – New Zealand

Ms. Lee Sai Choo, Dr. Tan Seng Chee, Mr. Ang Pow Chew, and Dr. Daniel Tan – Singapore

Mr. Samuel John Tayli, and Dr. Jacob Ilkiuyoni - Tanzania

Muvaffak Gozaydin - Turkey

Paul Fairbrother and Michelle Selinger – United Kingdom

Daga Makaza – Zimbabwe

An International Perspective of K-12 Online Learning: A Summary of the 2006 NACOL International E-Learning Survey

Introduction

In the United States, there were more than 500,000 enrollments in online courses in grades K-12 and more than one-third of public school districts offered some type of eLearning during the 2005-2006 school year. Research has been done on several virtual schools in North America; however, little information is available about current K-12 e-Learning initiatives across the world. The North American Council for Online Learning (NACOL) surveyed over 30 countries in order to highlight international trends in online learning, identify online learning initiatives and projects in individual countries, and to promote international dialogue for future collaboration.

E-Learning leaders from Ministries of Education and virtual schools provided NACOL with the latest information on the following topics: current initiatives, funding, student populations, content development and quality control, professional development, and current trends and obstacles. A summary of each country's returned questionnaire is described in this paper.

For the purpose of this study, online learning is defined as "education in which instruction and content are delivered primarily via the Internet." Such online learning may include a range of Web-based resources, media, tools, interactivity, and curricular or instructional approaches. Internationally, a variety of terms are used to describe online learning--including distance education, virtual schools, virtual learning, e-Learning, electronic learning. In general, the common theme is that this type of learning takes place over the Internet. As a reference, the age range for students is 5-18 years (elementary and secondary education).

Country Summaries

New South Wales, Australia

New South Wales Australia provides online learning to K-12 students through the Country Areas Program (CAP). The program services 248 public and private schools as a component of the Commonwealth's Programmes. CAP's focus is to improve the education of students living in remote and isolated communities. Seven consultants assist schools across the state in implementing programs, activities and workshops on online learning.

In 1999, CAP launched a central website for both teachers and students to help administer the program as well as to provide resources and online activities for all. The website averages over 38,000 visitors each week and features over 150 Research Modules (http://www.cap.nsw.edu.au/bb_site_intro/bbcap_intro.html) which provide easy access to research on the Internet. These modules are designed to encourage students to think critically by selecting, analyzing, and organizing their research to provide thoughtful and creative solutions to questions and situations. The website also runs "Maths on the Net," open-ended

math problems for ages 6-12 to solve in teams. (<http://www.cap.nsw.edu.au/motn/index.htm>) The newest feature of the CAP's website is the "Collies" (<http://www.cap.nsw.edu.au/Collie/collie.htm>). Collies are research competitions given over five week periods. Students are given clues to solve in order to find the "Collie" (garden gnome). Students must work collaboratively in teams from schools across Australia and all over the world.

Students in the CAP program live in rural areas of South New Wales. Over 80% of the students are in grades 1-4. CAP works with the state's Distance Education Centers to share resources and lessons. The Distance Education Centers provide video satellite feeds to students to provide synchronous collaborations amongst students and their teachers to create a blended learning environment.

Courses and resources for CAP are designed and developed by classroom teachers at state-run workshops. Teachers are provided with training in Higher Order Thinking Skills and developing units that challenge students to think. Additional training is provided on the website for teachers to complete individually. Teachers meet a few times each year to collaborate and develop new units.

The government provides all schools in New South Wales with computers (1:10) and high-speed Internet connections. Professional development workshops and course development is paid by CAP as well as the teachers' own schools CAP funds. Although, these things are provided by the government, students and schools in New South Wales must deal with obstacles such as bandwidth and classroom teachers' lack of technical knowledge and their "fear of the unknown."

CAP is continuing to market the program and website to other schools in New South Wales as there are still several sections of the Education Department who have not fully embraced it. The emergence of the Internet has provided the rural students in Australia with access to more resources and an opportunity at achieving a quality education. They can now access world-wide libraries, talk to scientists, other students and teachers, visit far off places, all from their classrooms! New South Wales CAP program will continue to recruit and train teachers on the skills necessary to challenge students using online learning.

South Australia

The national and state governments fund and develop content for online learning in Australia. The national Australian ICT agency in education and training, *education.au limited* (www.Educationau.edu.au) is owned by the education Ministers of all Australian Governments; it is currently working on several K-12 e-Learning projects such as creating national policy statements (<http://icttaskforce.edna.edu.au/icttaskforce/go>). Providing bandwidth to schools and education units, the development of high quality online services such as links, resources, collaborative spaces and shared information services are provided through Education Network Australia (www.edna.edu.au). The provision of career information and services can be found at www.myfuture.edu.au.

Online education standards have been developed and can be found at <http://standards.edna.edu.au/standards/go>. Online content is developed by the Learning Federation (<http://www.thelearningfederation.edu.au/tlf2/>). The national educational DNS service is managed by <http://www.domainname.edu.au/>. The Vocational and Technical Education (VTE) has created a project focused on bandwidth, content and services which has been implemented across Australia through the Australian Flexible Learning Framework (<http://www.flexiblelearning.net.au/flx/go>).

The Australian government has been working on the projects and initiatives described above, which have encouraged e-Learning within the country. The Ministers of Education and Training create an annual report (the report is not made available to the public) of e-Learning to the national Department for Education, Science, and Training (DEST) (www.dest.gov.au). The Vocational and Technical Education has seen an 80% increase in online enrollments, while e-Learning in schools has grown by 30%, and outside of public institutions, they have seen a 73% growth rate. These students are coming from urban schools in the middle to high income brackets. The majority of online learning in South Australia has been offered as a supplement to the school day; however, schools are starting to implement more of a blended learning environment.

Each state in Australia has a separate teacher training program, but very limited budgets. Universities are ultimately responsible for their training, but have not made e-Learning a priority. The Australian Council for Computers in Education (ACCE) (<http://www.acce.edu.au/>) also provides resources and professional development opportunities for teachers.

When developing content, the schools have a variety of standards to use, depending on their specific needs. The standards include: IMS, Dublin Core, EdNA metadata (http://www.educationau.edu.au/jahia/webdav/site/myjahiasite/shared/papers/edna_metadata.pdf), the Learning Federation's standards (<http://www.thelearningfederation.edu.au/tlf2/showMe.asp?nodeID=89>), SIFA, and SCORM.

Costs in the budget are priority to the government over the benefits to students and their education when it comes to measuring quality. EdNA (<http://www.edna.edu.au/edna/page1.html>), Flexible Learning (<http://www.flexiblelearning.net.au/flx/go/home/search?sr=flx&sr=flxspidered&qt=best+practice#resulttab>) and Knowledge Tree (<http://kt.flexiblelearning.net.au/>) provide news services with exemplary forms and examples of online learning.

Bandwidth, teacher pre-service education and professional development for teachers, an understanding and proficiency of the uses of ICT as a priority at senior governmental levels, and the lack of national policy and leadership in e-Learning are current obstacles. However, the provision of high quality online national services such as EdNA, myfuture, and flexible learning are promising programs and approaches to online learning, along with content development from the national ICT agency. Current trends, such as the provision of an

infrastructure in education by the States and improvements in broadband access for schools will help expand e-Learning in Australia.

Ontario, Canada

Education in Canada is a provincial government responsibility. The Ministry of Education (provincial) and Districts (local) at each level monitor and implement e-Learning programs. All provinces have made progress with regards to online learning, but a national plan has not been developed. There have been discussions around the collaboration of consortiums across borders but since each province has specific expectations for their credit courses this has not happened. There have also been some discussions around a national Learning Object Repository, but this is still in the beginning stages.

Funding for e-Learning is provided by the School Boards and Districts. There is no funding provided by the provinces, which has created large barriers for expanding programs. School boards are trying to work with other programs in order to continue to support e-Learning.

In Ontario, the Ministry provides a provincial LMS and LOR but puts restrictions and limits on their use. They can only be used for completely online credit courses and credit recovery modules, which do not allow these resources to be used in a blended model. The MOE created these resources and provides training for teachers on how to use them and create their own content, which several schools and teachers have taken advantage of to develop their own content. Teachers within School Boards will continue to be the main drivers of curriculum development. When developing the curriculum, each province has curriculum standards, but standards and expectations/guidelines for creating online courses do not exist.

Current obstacles for e-Learning in Ontario include funding, government support, leadership and direction. However, consortiums and partnerships have been key in providing the leadership, support, and direction of the e-Learning schools. There are currently three consortium groups in operation: the Ontario Strategic Alliance for eLearning (<http://www.elearningontario.ca/>), POOL, and the French Language Boards who share their expertise, resources, training, curriculum development, teachers and best practice ideas among their schools. The Alliance consortiums have also developed some standards for online courses and a quality assurance process and provide training for schools and teachers at two conferences each year.

In the Ontario Alliance there are close to 4000 students taking full credit courses and about 1000 in blended delivery. Across Ontario, there are an estimated 25,000 students taking online courses and this number continues to grow rapidly with the implementation of the Ministry's LMS. The majority of these students come from both rural and urban areas. They are seniors in high school taking courses they need in order to complete their high school diploma and to prepare for the university. They are taking these courses asynchronously,

although blended models are growing, but not quickly enough because of the restrictions set by the Ministry.

Quebec, Canada

The Ministry of Education, Recreation, and Sports in Quebec in conjunction with the 72 school boards have funded and supported the integration of information and communications technologies (ICT) since 1983. By 1996, 85,000 computers were made available for the one million students in the province, now there are 172,000 computers available for these students. All schools in Quebec have access to the Internet which was provided by the governments *Connectivity for Quebec's Communities* (<http://www.meq.gouv.qc.ca/lancement/villagesbranches/>) program. The province wanted to first provide ICT integration and infrastructure for public access, focusing on schools, youth centers, and public libraries before using them for e-Learning.

Computers are widely used in Quebec schools for teaching and learning activities, as well as for doing research and carrying out tele-collaborative projects in accordance with the pedagogical approaches advocated in the Quebec Education Program. Other current projects in Quebec are the *Remote Networked Schools*, (http://www.cefrio.qc.ca/projets/Documents/Synthese_EER_phase%202_anglais_final.pdf) a technology transfer centre may present this ambitious, large-scale project which is a vast inter-school learning project where students from a dozen small schools threatened with closure because of either remoteness or limited enrollments carry out online learning activities on the Internet. Quebec is also using the *Connected Classroom* series, which includes *Quebec Reads*, *Quebec Roots*, and the *Learn-by-Doing* projects. Other projects include the DECN e-Learning project in mathematics and science, the *Prof-Inet* for supporting teachers to initiate correspondence projects with over forty countries, and the *Inter-region* project which groups adult education classes online for support and basic learning which has been funded and created by the *Societe deformation a distance des commissions scolaires-SOFAD*. Hundreds of other e-Learning projects for students and teachers across Quebec can be found at the *Carrefour-education* portal (<http://carrefour-education.qc.ca/>).

Today, more than 50% of teachers are using the Internet and computers in their classrooms, and several more are using them for the administrative areas of teaching. 75% of households now have internet access, and 90% of these homes have K-12 students who are using the Internet to complete their schoolwork. Students involved in e-Learning courses are more often from urban elementary schools, although several of the projects listed earlier are being created for the rural schools.

The government has provided teachers with the appropriate training for using these tools as well as how to assist students. As part of the current reform of their education system, a cross-curricular competency focusing on the use of ICT was included in the elementary and secondary education schools in order to require its use. Then, a structure for supporting the integration of these technologies in teaching and learning activities at the elementary, secondary, college and university levels (*RECIT* network <http://recit.qc.ca/>; *Vitrine APO* <http://ntic.org/>; *Profweb* <http://www.profweb.qc.ca/>; *Profetic*, <http://profetic.org/>) were developed.

A structure for the evaluation, standardized indexing, and diffusion of electronic educational materials has also been created in order to ensure that any teacher seeking an educational resource for constructing a learning scenario could find the required teaching/learning resources (Quebec Standards Work Group <http://www.normetic.org/sommaire.php3>; *Centre de ressources didactiques informatisees (CRDI)* <http://logicielseducatifs.qc.ca/>; *Carrefour-education*, <http://carrefour-education.qc.ca/>; Collegial Centre for Educational Materials Development *CCDMD*) <http://www.ccdmd.qc.ca/>; *Eureka, Depot de ressources d'enseignement et d'apprentissage* <http://eureka.ntic.org/>).

There are currently two plans written for the integration of ICT in education: “The Ministerial Plan for the Integration of ICT from 1984-1995” and “The Marois Plan from 1996 to 2003.” These reports can be found at <http://www.ccl-cca.ca/CCL/Reports/StateofTheFieldReview/StateofTheFieldReview.htm> Quebec’s experience in ICT integration suggests several measure through which “e-inclusion” can become a reality, which include: the assistance in planning of ICT; public access to ICT in schools, libraries, youth, community and employment centers; inclusion of the ICT cross-curricular competencies; support in the development and evaluation of quality learning content; support in the purchasing of equipment and setting up of home usage via portals and e-portfolios; networking and connectivity support; teacher training; the fine-tuning of integration experiences and the communication of their results; and the development of online learning.

Until 2003, the government developed and published online content. Several companies in the private sector tried to sell the schools online content, but was too expensive, but some have survived and continue to offer the content at lower prices. In Quebec, teachers are paid according to their level of education, which has provided motivation for professional developments. The government offers several certifications in ICT and online learning, which thousands of teachers are participating in. The teachers have also requested new training and support programs for working with today’s computer-literate students. The ministry also provides funding to school boards for teacher training on *RECIT*, a network that promotes competency development through the use of technology and helps teachers integrate ICTs in the schools. The school boards have also developed *Societe GRICS* which also offers teacher training and technological and pedagogical support for K-12 teachers.

There are currently no standards in place for content development, but the Ministry does support the open-source portal *Mille sous U-portal* for creating online courses. School board support of this portal is growing quickly as well as support of other programs such as *Societe GRICS* and *Edu-groupe*. The Quebec Standards Work Group has set a few norms and standards for online learning and the Ministry has been participating on the national level to develop standards with the e-Learning Standards Advisory Council of Canada (eLSACC).

The major obstacle to integrating ICT and developing online learning is the training and support for teachers. Although 90% of teachers use computers for their administrative work, close to 50% are still not using them for teaching and learning activities. Teachers also lack

the time to support and guide their students in addition to the face-to-face activities. Although these obstacles exist, consortiums have been developed to assist with the sharing of resources and training. The province would like to adopt more of a socio-constructivist approach to learning in order to create more online learning communities and pedagogical scenarios. These consortiums are completing the necessary research to help school boards implement online learning into the schools.

For the measurement and evaluation of ITC-based learning, two recent studies indicate that 15-year-old students who regularly use a computer generally obtain better marks in mathematics and science than those not using a computer (<http://www.oecd.org/>). They also encourage the use of digital portfolios as tools for following up and evaluating students.

For the measurement and evaluation of various programs supporting the integration of ICT, the Ministry of Education distributes, collects, and analyzes a provincial questionnaire on the availability of and access to technology, as well as the degree to which ICT is being used for educational purposes in the schools.

Quebec's history shows that the challenge of integrating ICT into the classroom can be effectively met through financial investments spread over a number of years, and that the focus on human resources and professional development of teachers remains a priority. The Ministry must also support organized planning and gradual integration, emphasizing structured strategic actions while supporting the acquisition and development of digital materials that meet specific educational needs.

China

Due to high costs and the current state of the Internet, e-Learning in China is still new and only used as a supplement to the current face-to-face content. Currently, there are 67 universities participating in a pilot to run online programs in both large and mid-sized cities. In the urban areas, if students choose to study online, they must pay for the classes themselves, except in special circumstance e.g. if they live in genteel poverty, then the government or school can reduce their fees or they can apply for a scholarship. However, in rural areas, especially the poor regions, government will provide aid the students to go to school, if there is access to the Internet.

The number of online learners is growing, but the increasing number of e-Learners still accounts for a very small percentage of China's population. Students under the age of 22 years account for 23% of online learners, ages 22-29 account for 50% and 27% of 30 years and older aged students are participating in online learning. The majority of these students are from the urban areas of China where students have access to the Internet through broadband connections.

There are three main obstacles the Chinese must overcome before they can build a K-12 online learning program. Because online learning is in an early phase, there is a lack of qualified candidates with the appropriate certifications. Also, the traditional educational system has been developed quite well in China and online learning will have to be

designed so that the design, quality, management, cost, and culture is more effective in order to sell the concept to the government. Finally, the overall Internet technology is poor. There is not enough bandwidth for students to access multimedia rich courses. Sounds are broken up, pictures unclear, which allow students to only learn through reading characters. Currently e-Learning is only delivered through asynchronous technology.

Although these obstacles exist, online education is still a promising approach because it can meet China's demands towards providing education services to the large population. Because of this the organizations and private companies will succeed and profit if they are created at a reasonable cost. Online education as a new and modern educational form is growing fast, in 1999, the online educational market amounted to 1.7 billion US dollars, while in 2004 it rose to 23.1 billion US dollars, and the average growth rate was 66%, a very high increase. Currently, e-Learning is a social and practical way to use computers and the Internet. Businesses are excited to expand because of the huge benefits to educational institutions, investors and the government. This could also create a significant impact on the economy. Currently, there are not enough educational resources at this time and e-Learning is the most effective and practical choice for improving China's educational system.

Two main reports on e-Learning have been written to describe the master plan for online learning in China. The "2004 China Network Education Research Report" can be found at <http://www.online-edu.org/html/industry/inland/20050715/3,4554,0.html>. The "2006 China Network Industry Analysis and Investment Consulting Report" is more recent and can be found at <http://www.ocn.com.cn/reports/2006122wangluojy.htm>.

The government and universities are currently researching how to develop online courses and content. Teachers have not been trained in the usage of online learning resources in their classrooms. Online learning is still in its initial stage and is being used more as a resource or extension of the content in the classroom. The Ministry of Education of the People's Republic of China has begun to identify how to measure quality of the online courses. Standards for the development and distribution of e-Learning have also been developed and can be found at <http://www.vschool.net.cn/elr/ziyuan/zy0010.htm>.

In the current state of China's higher education, online education has a large potential to be developed and grow. If the population of students being educated rose by 1%, almost 100 million new students would be available to take these classes. Although this amount of students cannot be serviced immediately within a short period of time, with the proper implementation, all students will eventually be able to participate over a number of years. Specialists have forecasted that the excitement of online education will push the current, non-ideal Internet in China to make profits through e-Learning.

Hong Kong

E-Learning in Hong Kong enables students to engage in collaboration, inquiry and projects at anytime, from anywhere. It was stipulated in the new IT in Education Strategy Policy Document "Empowering Learning and Teaching with Information Technology"

published by the Education and Manpower Bureau (EMB) in July 2004 that suitably designed e-Learning platforms to support the above-mentioned learning activities, which will be provided for all primary and secondary schools. All public sector schools in Hong Kong are funded by the Government. Students are not required to pay extra for taking any e-Learning course or using e-Learning materials offered by their schools. The IT in Education Section of the EMB works in three areas to promote e-Learning in Hong Kong schools: (a) provision of funding for schools to procure Learning Management Systems that fit their needs, (b) provision of funding for schools to purchase courseware/learning objects for use on the e-Learning platforms, and (c) organization of professional development programs to train teachers on the theories and practices of implementing e-Learning in schools.

Hong Kong is a small country, where students can easily travel to school and meet their teachers every day. E-Learning is used in Hong Kong as a means to provide educational support to students and to cater to their individual needs. E-Learning is not likely to take over face-to-face teaching in Hong Kong; however, the use of Information Technology, including e-Learning, is enhancing student learning and is practiced daily in Hong Kong schools. The development of e-Learning in local primary and secondary schools for the next few years was discussed in the new IT in Education Strategy 2004, which can be downloaded at: <http://www.emb.gov.hk/index.aspx?langno=1&nodeID=2497>

Currently, there are no schools which provide entire online courses for students to complete all of their studies from home. Instead, local teachers create additional learning activities for students to work on online after school or at home as a means to strengthen the classroom teaching which occurs during regular school hours. Students also complete tasks, collaborate with one another, and receive feedback from their peers and teachers online.

Teachers develop their own e-Learning materials which best fit the needs of the students in their individual schools. Professional development programs for training teachers to apply e-Learning and for using web resources in their classrooms occur in refresher and in-service courses, which are regularly conducted.

The EMB has not created any standards for developing and distributing online education in schools. There are two major e-Learning platforms used by schools and teachers to create online courses/learning activities. Implicitly, some standards exist in the online materials developed by local schools and in their delivery. No mechanisms to measure the quality of e-Learning have been developed at this time. However, collaborative brainstorming sessions are regularly conducted with guest speakers from local schools and other organizations who present their personal experiences on how e-Learning could be effectively used in different aspects to enhance learning and teaching in schools.

All schools in Hong Kong have adequate computer equipment with broadband Internet access installed. Teachers and students have excellent IT skills, and most of them are considered to be technologically savvy, and are willing to accept new models of teaching and learning. The already heavy workload of teachers is a potential obstacle for the

expansion of e-Learning as teachers find it hard to find time to develop additional materials for students and to provide extra support for students online after school. Another obstacle is the limited amount of online resources and learning objects which are available on the market for teachers.

The most effective approach to e-Learning in Hong Kong schools is the use of a blended model. The amount of time between the face-to-face session and the online session may be regulated depending on the subject being taught. E-Learning will continue to play a supportive role to complement the face-to-face classroom in Hong Kong. In the future, face-to-face teaching will continue to take precedence over e-Learning in local primary and secondary schools.

Iran

Online education in Iran is delivered by both the private sector and government organizations. The Ministry of Education (MOE) administers e-Learning under three main areas: purchasing software for teacher professional development to create online content, managing the country's four Intelligent Schools (distance learning schools which deliver both content online and on compact disc), and to build a network to connect all schools. In the private sector of e-Learning, several companies provide online courses in geography, English, and software for high school students, as well as completion certificates which are approved by the MOE.

Students from the urban areas and large schools are participating in online courses. E-Learning in Iran is based entirely on a blended model of learning. Courses are developed by the government and are free of charge for the student. The government has been working to create education standards, but they have not yet been published. There are currently no entirely online courses in the country; however, a private company is developing independent courses for first year high school students, which the students themselves will pay to enroll.

During the past five years, the government has been working to train and familiarize teachers with the development of electronic content and online courses. Several teachers now have these skills and are using them with the computers and Internet in their classrooms. Teachers are developing the online content, but the majority of it is still created and sold to schools by private companies. Several teachers in Iran are also collaborating with other teachers from all over the world in online projects sponsored by iEARN and ENO. At the university level, Iran is working with Italy, Germany, and the United Kingdom to develop online courses.

Computers are still new to the citizens of Iran. The public sector is weak and the private sector is too expensive for the people. Because the technology is so new, people are scared of it. The government is worried about the lack of enough filtering of the Internet. Funding is also an obstacle for the growth of online learning.

Although there are several obstacles facing Iran in the area of e-Learning, they have still managed to educate students and teachers on the importance of it. Over 20,000 students

have participated in some format of e-Learning in Iran. A list of schools using the Internet can be found at <http://www.schoolnet.ir>, but only a few of them are delivering curriculum via the Internet. Examples of schools and universities using e-Learning can be found at: <http://home.elearning-iust.ir/> and <http://www.kntu.ac.ir/>.

A master plan for schools can be found at <http://elearning.roshd.ir> and <http://www.schoolnet.ir>. Other resources related to e-Learning in Iran can be found on the following websites: <http://mftsite.com>, <http://farasima.com>, <http://sematec-c0.com>, <http://www.Tebyan.net>, and <http://aicte.com>.

Japan

Japan has a few universities delivering online courses, but at this time elementary and high schools do not provide courses for students over the Internet. There is one correspondence high school which is using the Internet with the curriculum, but presently the only school in the country doing this. The majority of schools in Japan do use the Internet to extend the curriculum in their classrooms in a blended model, but they have no plans to offer only online courses.

The online learning system “Tokyo Jogakkan Primary School Science Net for e-Learning” (<http://www.ak.cradle.titech.ac.jp/rikanet>) was created to provide test prep skills for elementary school students. The country wrote a report for online learning which can be found at the Data Pacific: E-Learning Contents website at http://www.datapacific.co.jp/e_learning/e-ichiran_10.htm.

Students participating in online education tend to be from large schools in urban areas where teachers are using a blended model to integrate e-Learning into the curriculum. Students must pay for access to online courses.

Researchers from universities and private companies create online courses in Japan. Currently, Learning Management Systems and online course materials are all purchased. No training has been developed for teachers at this point in time.

Standards and tools used to measure quality for online courses have not been created at this point in time. Classroom teachers are extremely busy with their daily teaching and administrative duties and have not had time to see the possibilities of e-Learning. Rural areas in Japan are actively researching ways to use e-Learning in the K-12 curriculum and will most likely take the lead to expand it throughout the country.

Kazakhstan, Kazakh

The Internet came to Kazakhstan (Central Asia - CA) after the nineties, after the collapse of the Soviet Union. It quickly became a popular way to access information. Recently, the larger state universities and now private universities have started to use the Internet as a tool, providing distance education and e-Learning to their students. Central Asia defines e-Learning as the transfer of data through the Internet which is used to gain knowledge.

Universities, with the help of the government are developing their own courses and private companies have started developing content for elementary and secondary schools to purchase.

Currently, Karaganda State University provides online courses for their students. Each student receives a login and password to access their data and lectures on a website. The iEARN network also provides several projects which allow students and teachers to collaborate with other students and teachers across the globe. High schools and universities plan to provide more university level courses through the Internet to students. Elementary and secondary schools plan to use the Internet to gain knowledge and methods of new pedagogical theories for education in order to use them in the face-to-face curriculum. Elementary and secondary school teachers have been interacting with one another online, discussing their experiences and new ideas in order to grow as teachers.

There are 8,091 public schools in Kazakhstan, serving over three million students as reported by the Agency of Statistics 2004 report. About three to five percent of these students, very few, are currently participating in online courses. These students are an average age of 13-19 years and have computers and Internet access at home. They tend to live in the urban areas and attend large high schools. The majority of them regularly use the Internet for entertainment such as email and gaming, but not as a learning tool. They tend to need extra support from their classroom teachers when completing online courses.

Only teachers, who know how to use computers and the Internet, speak and write in English and understand the concept of project-based learning and collaboration are developing online courses. These tend to be younger teachers, just getting started in the field. About eighty percent of high school and university teachers have been trained to use the Internet as a teaching tool. However, there are very few schools with access to the Internet and multimedia computers, which has kept e-Learning from expanding in Kazakhstan. Elementary and secondary teachers have been poorly trained on using computers and the Internet at this time. Current Computer Science teachers are taking the initiative to assist these teachers. However, there are very few of these teachers in the country, making this an ineffective way to continue professional development for online learning.

There are no emerging standards in Kazakhstan for developing and distributing online education. This field is still new and has not been fully developed. Teachers use information and freeware software from the Internet. Education on copyright issues needs to be developed for teachers and students. Quality is hard to identify at this point in time. Quality is currently being measured on the amount of time students are expected to complete the required tasks. E-Learning is a tool currently used to extend the face-to-face curriculum. Students can learn and study on their own time. Elementary and secondary teachers are integrating the Internet into their everyday curriculum, but have not yet created online coursework to be completed from the student's home.

E-Learning is still new to Kazakhstan. Funding for online learning is paid for by government grants and student tuition. A few foreign foundations (Soros, Irex) fund

online education initiatives by providing websites, web space and Internet tools for teachers and students. There are no official reports on online learning for the country, but a master plan does exist. The government plans to connect all of the schools to the Internet and will make a local network across the country to connect all of the schools to each other. This will allow students to eventually use the Internet both effectively and actively for online education.

There are several obstacles in the way of expanding online learning in Kazakhstan. Students and teachers do not have the knowledge and skills to use computers and the Internet. The Internet is too expensive for most families to purchase it for their homes. The skills and access make it difficult to motivate teachers to build online courses. However, high school students can complete some of their studies from university case-studies and syllabi on the Internet, while interacting with their teachers and other students, which was not possible a year ago. Elementary and secondary students are using WebQuests in their face-to-face classrooms and hope to extend these collaborative activities to their homes in the near future. The development of online learning is slow but is moving in the right direction. Teachers and the government hope to continue researching how other countries are implementing e-Learning in order to expand it throughout Kazakhstan.

Nepal

E-Learning in Nepal has become very effective and is benefiting those students who have taken advantage of it. iEARN has brought its programs and seminars to Nepal's students and teacher to introduce and share the Internet learning environment experience. Teachers have also collaborated with other teachers in the United States and other countries on projects and professional development through iEARN.

Online learning is just beginning in Nepal, but the country has plans to expand the user of e-Learning for all of the citizens. The government and UNESCO have announced their support of the creation of 205 community learning centers throughout the country which will support a holistic development of education. The government would also like to use e-Learning to help administer schools and will train school management committees and parent teacher associations using e-Learning.

Nepal has been involved in a civil war for several years and would like to use e-Learning to extend victims of war, orphans, disabled and exceptional students' educations. The country is moving towards a cease fire and the people's great democratic movement was victorious. A result of this war is UNESCO's "Right to Education for All by 2015" act. The government is brainstorming ideas on how e-Learning can contribute to education about conflict management, peace keeping, and peace management.

The teachers in Nepal currently use a teacher-centered learning environment with a harsh punishment system which dates back hundreds of years. Teachers believe that e-Learning can help redesign the current pedagogical approaches to a more student-centered learning environment, without the punishment system.

Finally, Nepal has a high rate of illiteracy amongst the adult population. These people are unaware of their illiteracy and do not value an education. Student drop-out rates and the decline of school enrollments may provide an alternative way to educate these students and adults. The future of e-Learning in Nepal is promising but still in its beginning stages.

New Zealand

In New Zealand, there are no separate branches of government working specifically with online learning; however the government does support e-Learning as a whole and is working to grow its usage throughout the country. E-Learning in New Zealand is defined as: "Learning and teaching that is facilitated by or supported through the smart use of information and communication technologies" (p.4 Enabling the 21st Century Learner: An e-Learning Action Plan for Schools 2006-2010, Ministry of Education 2006.

(<http://www.minedu.govt.nz/index.cfm?layout=document&documentid=10475&data=1>) As online learning is only one facet of the larger e-Learning picture, the number of participants is not available at this time; however, there are a significant and increasing number of schools offering courses and learning via the Internet and online media.

Generally schools use their existing operational funding to provide online learning for students, however there is specific funding provided by the government available for e-Learning. The funding is generally for start up projects and initiatives or for schools to pilot new projects and initiatives. Examples and more information about current pilots and initiatives can be found at

<http://www.minedu.govt.nz/index.cfm?layout=index&indexid=6919&indexparentid=1024>.

Three documents describing New Zealand's plans for e-Learning in the school sector have been written. The Action Plan, referred to above, was created to "outline the key outcomes and actions for e-Learning in the New Zealand school sector for 2006-2010. It describes the goals for e-Learning in schools and the projects, tools and resources that are being developed to address those outcomes." The National Digital Strategy "provides an integrated framework for existing and future initiatives to encourage the uptake and effective use of ICT for economic, social and cultural gain." "It provides a direction for government policy for the next five years..." (P.6 Digital Strategy: A Draft New Zealand Digital Strategy for Consultation, Ministry of Economic Development, 2004). The three main foci of the Digital Strategy are: "Content - Information made available via digital networks; Confidence and Capability - The necessary skills to use ICT effectively; and Connection - Affordable access to ICT infrastructure such as telecommunications networks, computers and mobile phones" (p.7 Digital Strategy). Finally, the ICT Strategic Framework's "purpose is to provide the mechanism to guide and coordinate ICT investment towards the government's vision of improved education outcomes. The Framework is aligned with, and supports, the government's E-government and National Digital Strategies and provides the foundation for effective e-Learning practices to be integrated into New Zealand educational practices" (p.1 ICT Strategic Framework for Education, Ministry of Education 2006). Other research reports on e-Learning in K-12

schools can be found at

<http://www.minedu.govt.nz/index.cfm?layout=index&indexid=6920&indexparentid=1024>.

A complete list of projects and initiatives pertaining to e-Learning in the New Zealand schools sector can be found at:

<http://www.minedu.govt.nz/index.cfm?layout=index&indexid=6919&indexparentid=1024>.

An example of a successful online learning initiative is the Virtual Learning Network (VLN), which is a nationally brokered service that supports e-Learning in particular video conference capable schools. The VLN extends a vision of what can be achieved and what is possible through the use of Video Conferencing and other synchronous and asynchronous technologies to establish an online, networked learning environment across New Zealand (and beyond). This vision is consistent with emerging thinking about networked and open schooling, and the understanding of transforming education through school networking.

In 2005, Tertiary education organizations were approached to increase their offerings through STAR and Gateway funded courses for year 11-12 students. Secondary Tertiary Alignment Resource or (STAR) courses are provided collaboratively by tertiary providers and schools to enable schools to facilitate smooth transition and access from schooling for students in their transition to further education or employment. The Gateway fund offers senior secondary school students structured workplace learning across more than 50 industries and hundreds of businesses around New Zealand. In 2006, 24 tertiary courses are being offered on the VLN. Now that a robust system is in place for the senior secondary and tertiary offerings, more attention can be given to other key areas such as brokering students below the level of 11-13 and for GSE and Early Childhood. The existing network is looking for opportunities to expand into these areas with sustainable scalable projects that will enhance and raise the educational outcomes of all learners through the use of the VLN and associated technologies. Further information about the VLN can be found at <http://www.virtuallearning.school.nz>.

There are a variety of students accessing e-Learning across New Zealand in a variety of ways. Correspondence school enrollments provide courses to students living in remote areas or those accessing subjects not available at their local schools. The correspondence school also provides classes for students who have not had positive experiences or have faced exclusion at their brick and mortar school. The Maori medium students access Maori speakers in different subject areas through video conferencing. Many students are blending their online learning with face-to-face options, such as users of Study It (<http://www.studyit.org.nz/>) and the Virtual Library Helpdesk (<http://www.anyquestions.co.nz/en/anyquestions.co.nz/en/anyQuestions.html>).

Training for teachers to create online content is available in New Zealand. Current professional development initiatives can be found within the reports discussed earlier. The Virtual Learning Network also provides teacher training specific to building and teaching online courses. The courses are developed by teachers on a collaborative basis

with the Cantatech program. Other programs, such as StudyIt and the VLN also build content for online courses.

New Zealand is participating in discussions to 'adopt or adapt' international standards for e-Learning through its IMS Global Learning Consortium membership and also its participation in the SCORM standards. There is also reference to standards as part of the work being undertaken under the auspices of the ICT Strategic Framework as follows (p. 4):

Access & interoperability standards	Core shared services and resources are easily accessed and used across the education sector There are clear interoperability standards for all major collaborative tools and environments Meeting defined education sector ICT standards ¹ will be one of the measures of the quality of an education organisation
--	---

A range of methods is used to measure the quality and effectiveness of online courses. Online courses can be assessed against external examination/assessment results by the National Certificate of Educational Achievement (NCEA). These assessment procedures can be found on the New Zealand Qualifications Authority website at <http://www.nzqa.govt.nz/ncea/assessment/exemplar/index.html>. Ongoing pilot initiatives are also evaluated regularly in reports such as the 2004 report from Otago University on Video Conferencing Schools Cluster (OtagoNet) which can be found at http://www.otagonet.school.nz/docs/eLearning_OtagoNet_2004.pdf. Other evaluations are created on the Digital Opportunities projects (Digiops). These are a series of pilot initiatives based around e-Learning in schools. The projects and their evaluations can be found at <http://www.digiops.org.nz/>.

Obstacles for the growth of e-Learning in New Zealand include the uptake of broadband Internet, the cost of hardware and software, technical issues and support, teacher professional readiness, and policy issues. Additional issues which have been identified can be found in the e-Learning action plan for schools at <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=10475&data=1>. There are several obstacles to the growth of e-Learning; however, New Zealand is continuing to develop several new e-Learning initiatives which can be found at <http://www.virtuallearning.school.nz>. There is not a single approach to online learning in New Zealand, as it is considered a more wide-spread opportunity for students and teachers to access knowledge and information.

Singapore

Singapore schools have the autonomy to decide how they want to implement the use of IT for teaching and learning, which includes online education. At this point in time, about 75% of the schools have subscribed to learning management systems (LMS), and the percentage is rising as the remaining schools plan to come on board. A few have also developed their own system using the open source software, Moodle. This works out to about 400,000 students who have at one time or another engaged in e-Learning activities. The country's goal is to have all secondary schools (grades 7-10) and junior colleges (grades 11-12) using an LMS by the end 2006. As of November 2006, all (100%) of secondary schools and junior colleges and 134 (85%) primary schools (grades 1-6) are using an LMS for teaching and learning. Primary schools are also encouraged to have a LMS installed for e-Learning but an official goal has not been set. (See http://www.moe.gov.sg/edumall/tpm/doc/lms_survey.pdf and <http://www.itsc.org/sg/tc/tc.html> and <http://www.itsc.org.sg/events/lstc1005/WTDSurvey2005.pdf> for more information and results from recently conducted surveys about the growth of e-Learning in Singapore.)

Schools are provided with an IT Grant by the Ministry of Education based on pupil enrollment. The IT Grant funds IT equipment, software and services. Since 2003, the IT Grant has been devolved to schools. This devolution approach gives schools the autonomy and flexibility to plan their own IT programs to meet their unique school needs and to embark on IT initiatives, such as online learning and customized learning management systems. Most schools tap the IT Grant to pay for subscriptions to the e-Learning systems and content.

Given the small size of Singapore, e-Learning is only one of the strategies to facilitate access to learning. The main focus of Singapore's IT Master plan (<http://www.moe.gov.sg/edumall/mp2/mp2.htm>) is to develop teachers' capability and capacity to seamlessly integrate ICT into the curriculum to bring about engaged learning for the students. As of May 2006, the number of students able to access e-Learning depends on the available content provided by the content providers. In some schools, the LMS is often used by students to access lesson activities or assignments from home, e.g. at Maris Stella High School, students access a Mathematics online lesson to learn Geometrical Construction through the use of movies:
http://ali.apple.com/ali_sites/sgli/eshibits/1001179/.

Singapore is a mainly densely-populated urbanized society, and the schools are rather large with an average of 1300-1700 students (<http://www.moe.gov.sg/esd/Factsheet%202005.pdf>). Schools currently using an LMS are offering online lessons to their students using either subscription based content, school created content, or a combination of both. Most of these lessons are within the core subject areas such as English, Science, and Mathematics and are conducted in the school computer laboratories. A blended approach is often adopted in schools, with a mix of face-to-face instruction and online learning; however, students in some schools can purchase a personal subscription to the content in order to access the content from home.

Students can pay for these subscriptions with money from the Edusave Grant, which is provided annually by the Government to every Singaporean pupil for their enrichment learning activities. The Edusave Grant, first started in 1993 with an initial capital of SG\$1 billion, is funded by the Government for the purpose of giving grants and awards to schools and students. This enables schools to conduct enrichment programs and procure additional equipment and resource materials to enhance the quality of teaching and learning. The Grant also rewards students who perform well or who make good progress in their academic and non-academic work, and provides students and schools with funds to pay for enrichment programs or to purchase additional resources.

A number of schools in Singapore have adopted e-Learning week, where students do not attend school but stay at home working on lessons and assignments delivered through the learning management system. During this week, teachers facilitate the learning and provide feedback via email and other electronic means. The Hwa Chong Institute started the e-Learning week in 2005 with about 600 students. This institute is made up of a secondary school (12-16 years) and a junior college (16-18 years). The school implemented an e-Learning portal in the late 1990s in order to start the e-Learning week. It was so successful that in 2006, all 1200 secondary students were able to participate. During e-Learning week, students stay at home and complete all of their lessons on the Internet. Teachers create lessons specific to the needs of their students. Because the teachers are developing their own content to meet their individual students' needs and currently have no standard design and are not currently SCORM compliant. Teachers and students collaborate using several different tools such as podcasts, instant messaging, eTV, and webcasts. The junior college teachers are currently designing online lessons for their students and the school is upgrading their network and software in order to allow all students, both Junior College and Secondary students to participate in e-Learning week in April 2007.

The Raffles Institution (RI) has been participating in e-Learning week since 1999. E-Learning week has continued to grow and has become so successful that in 2006, e-Learning week was phased out and e-Learning is now integrated into the school's curriculum on a full-time basis. Students interact with one another and the teachers in online activities and discussion forums which are part of the learning packages they complete over the Internet as part of their curriculum. The lesson packages that have been developed are interdisciplinary in nature and involve all levels and subjects. The lesson packages are SCORM (Sharable Content Object Reusable Model) compliant, and are designed based on the ADDIE model (analysis, design, development, implementation and evaluation). Feedback from teachers and students has been positive. E-Learning has opened up new avenues for teachers to experiment with the delivery of their lessons. It also enables them to incorporate technology into learning and is a creative avenue for students to express themselves. Teachers have also found that some students can learn difficult concepts on their own and that each lesson can be customized to address the personal needs of each student. Teachers have also found the online discussion forums to be a great way to communicate with students and assess their understanding of topics/concepts learned. The only challenge of e-Learning, according to the teachers at RI, is the time spent on designing the e-Learning packages. Students have found the self learning packages to be

interesting and enjoyable. They also found that e-Learning provides flexibility in learning and thus enables self-directed learning to take place.

Other schools are using a variety of technologies and e-Learning within the classrooms. For example, wireless mobile technologies such as handhelds and flashloggers (a type of datalogger) are being used for outdoor learning in science, and dataloggers and wireless tablet PCs are used for fieldwork, research projects and web trails. WebQuests are also used to facilitate fieldwork processes and inquiry-based learning in an online environment. Specific examples and more information can be found at http://www.moe.gov.sg/edumall/success_stories_archive/tl/priesta_nan_hua.htm and http://www.moe.gov.sg/edumall/success_stories_archive/tl/pocket_pc_datalogger.htm.

A specific example of this is at the Crescent Girls' School. Online learning takes place during a geography lesson. The teacher can e-mail a map to the students' wireless Tablet PC. (The whole school operates on a wireless network.) Their geography textbook is also digitized, allowing the students to log into the Internet immediately in the middle of a lesson to find information from a particular website or somewhere on the World Wide Web, thus engaging them in sharing and discussions offline and online with their peers. More specific details and examples of this can be found at http://www.pcap.fujitsu.com/news/2004/pr_040804_st.html and http://www.backpack.com.sg/pressRelease_020305.html.

Generally, private companies develop the LMS and content for schools which use the LMS and content on a subscription basis. Where this occurs, schools have to purchase them, usually on a subscription basis. The Educational Technology Division within the Ministry also produces digital resources for online learning for subject areas where there is market failure or of strategic importance to Singapore. The digital content is produced either in-house by a Media Production Unit or in collaboration with school teachers and/or with industry or outsourced to industry. Some schools, especially those that own the LMS, also develop their own digital resources as they would like to customize the digital resources to suit their teaching curriculum/syllabus. But this is rare as the development of resources is time-consuming, and the number of teachers who are IT-savvy in the use of these IT tools is limited.

“iSHARE” (Inter-Cluster Sharing of Resources) is a content management framework which allows schools working within a cluster to share digital content with one another. This intranet framework facilitates the sharing of digital teaching and learning resources among schools in order to support online learning in the schools. Since it launched in May 2005, there have been over 12,000 digital resources uploaded by teachers in the 40 clusters of schools. The teachers have found the platform to be useful because of the 24/7 access to a pool of resources created by their peers. The framework has been found to be workable and is gradually being extended to other clusters of schools.

Teachers are trained on the use of IT for teaching and learning. The MOE has developed an online learning website, VITAL, for the professional development of teachers at <http://www.vital.moe.edu.sg/intro/index.htm>. Schools can also organize training for their

teachers on the use of e-Learning resources. One example is training their teachers to use WebQuest as part of developing teachers to use e-Learning resources. Some schools like White Sands Primary which started the WebQuest project on a small scale have now expanded the use of WebQuest at a school-wide level. Another example is training teachers in Qihua Primary in the design of wireless e-trails to engage their pupils in authentic problem solving tasks. The wireless laptops were used to supplement other computer-based lessons. Qihua Primary has expanded this project to include other subjects like Physical Education and Health Education. More information about professional development programs can be found at: http://www.moe.gov.sg/edumall/pro_develop/workshops.htm, http://it.asia1.com.sg/newsdaily/news001_20030317.html, and <http://www.mslss.net/nzitsymposium05/ITSymposium.paperlist.htm>. In addition, the Civil Service College also provides opportunities for teachers to learn online should they choose to do so. (<http://www.ipam.gov.sg/>)

Several groups in Singapore, including the Information Technology Standards Committee (ITSC), an industry partnership supported by SPRING Singapore, and Infocomm Development Authority of Singapore (IDA) have developed a Specification for e-Learning Framework. This framework provides standards for e-Learning. It provides a comprehensive approach to developing resources such as courseware which is reusable and interoperable in different learning environments. A copy of the framework can be found at http://www.itsc.org.sg/tc/6th_term_compo/lstc.html.

In addition, IDA is also currently working with ITSC to develop Content Exchange Metadata Standards (CEMS) and Taxonomy Standards for the Education Sector. More information about this project can be found at <http://www.itsc.org.sg/events/lstc1005/CEMS.pdf>. It is hoped that by publishing the Content Exchange Metadata Standard, schools, commercial content providers, and education content creators will be able to describe their content using a common language for the local context (closely tied to the Singapore schools' syllabus) and be able to distribute and/or exchange relevant content easily via metadata.

The quality of online learning in Singapore is tied closely to the development of quality digital resources for education. An initiative to allow the sharing of useful digital resources among Singapore schools is the development of common e-Learning standards so that it facilitates inter-operability in the exchange of content and that it meets a common 'taxonomy standards'. As a follow-up to this development, Singapore is currently looking into a framework for the development of digital content, including e-Learning resources. It will provide a set of guidelines to facilitate and ensure the development of quality digital content by commercial vendors. The MOE also has a website of digital teaching and learning resources to ensure that resources are pedagogically sound and easily available to teachers. The resources can be found at http://www.moe.gov.sg/edumall/tl/digital_resources.htm. Schools have also ensured that the LMS they subscribe to meet minimum requirements so that the setting facilitates online learning (a checklist is available at http://www.moe.gov.sg/edumall/tpm/tp_kit.htm#el). This includes requiring vendors to

design learning materials that are pedagogically sound and relevant to the curriculum standards and requirements. Vendors are also required to make continuous improvements suggested by the schools that purchase or subscribe to the LMS. A Service Level Agreement usually forms part of the package.

Several obstacles exist in Singapore for the expansion of e-Learning. The cost of subscribing to an LMS is a major consideration, and some schools are looking at ways to ensure there is value in the money being spent. As pedagogy and design involving e-Learning are still evolving, teachers' capability to use e-Learning creatively and innovatively is still an issue. The Education Ministry is also looking at ways in providing access to a PC bundled with Internet access for needy students. A significant number of students, particularly in the primary schools (Grade 1 to 6) still do not own a computer or have Internet access at home. Recently, the government set up a fund called the Opportunity Fund which could be used by schools to assist these students in purchasing computers at a special rate. This would provide opportunities for these needy students to engage in online learning activities with their peers.

However, the few obstacles involved in the area of e-Learning in Singapore have not gotten in the way of the several exciting and promising approaches and trends in online learning. The Infocomm Development Authority of Singapore (IDA) is leading a national effort to formulate and develop "iN2015" (pronounced "in twenty fifteen"), a 10-year master plan to grow the infocomm sector and to use infocomm technologies to build a well-connected society. The scope of iN2015 plan is not limited to infrastructure and manpower development. It will include initiatives in digital media, education, financial services, healthcare, manufacturing and logistics and tourism. 'iN2015' will be launched in 2006. More information about iN2015 can be found at <http://www.in2015.sg/> and http://www.mica.gov.sg/pressroom/press_060303.htm.

Several Singapore schools are already using Tablet PCs, dataloggers and handhelds with wireless connectivity to change the way curriculum content is delivered and the experience of how learning takes place in schools. The experiences gained have facilitated a more inquiry-based approach in the teaching of Science, and more collaborative activities among pupils. With the use of Tablet PCs, for example, online learning is possible as it is connected wirelessly to the school's server. Pupils can search for resources and make connections of information across disciplines easily, and this enhances learning in a way that was not possible in the past.

Online learning is increasingly adopted by schools as part of their learning process. Project work and the shift to a more learner-centered approach have encouraged independent learning among students. Other promising approaches to online education in Singapore include:

- Use Open Source Software based LMS' that have been designed and developed based on sound pedagogical approaches, e.g. Moodle. It has been developed based on the following pedagogical principles: Constructivism, Constructionism, Social Constructivism and Connected and Separate.
- Incorporate LAMS (Learning Activity Management System) into schools' LMS'.

- Develop learning content in terms of learning objects and storing them in a repository.
- Use scaffolding techniques like WebQuests to engage students in resource-based learning.

Online learning is continuing to advance and grow in Singapore. Students are using WIKI's, blogs, and photo blogs to aid in the reflections of their learning, as well as incorporating Student Profiles into the LMS to build community. Teachers are offering small learning objects on PDAs and are using these PDAs to complement online learning. Information mapping is being implemented to hand the information overload, and the incorporation of a portal-like interface into the LMS is taking place. There is a movement towards using more open content such as the Wikipedia. Finally, online journals are being used to chart student progress, which is allowing them to see the process by which they learn is as important as what they learn in the end.

Tanzania, East Africa

Online learning is new to the East African country of Tanzania. In most schools, colleges, and universities, online learning is non-existent. In the rural areas of Tanzania, there is no electricity, which makes it extremely difficult to access the Internet. The major university, St. Augustine University of Tanzania is leading the way in this field by participating in online discussions and posting course materials and resources on the Internet. Students can access the Internet from Urban Centers to conduct research and complete their studies.

Several teachers in Tanzania have participated in courses given by iEarn, which has prompted a proposal to train teachers to use computers and the Internet in their classrooms. They would also like to create an online teachers' forum in order to hold discussions, and to share lessons, ideas, and resources on different topics. First, the schools must obtain computers and Internet access before they can begin. At the present, each school has one computer. Most people in Tanzania go to Internet cafes in Mwanza City to access the Internet.

Those who are interested can volunteer to train teachers on how to use the Internet as well as building courses and resources. One teacher has linked his school to (<http://www.epals.com>) in order to communicate and collaborate with other schools outside of Tanzania.

There is currently no master plan for e-Learning in Tanzania; however, more and more teachers are taking classes through iEarn and learning about the possibilities and benefits it can bring to their students and teachers. The schools must first be equipped with the technology. Teachers need to be educated on using the technology in order to see the importance of e-Learning and how it can build on their economy and the students' educational and social development. In order to do these things, the members of the Tanzanian government must also be educated in order to fund these projects. Teachers in Tanzania are looking for support in collaborating to make their dream a reality.

Turkey

E-Learning began in Turkey in 1995 by the Turkish Education Foundation, which was created by prominent businessmen and women in the country. The local governments started with 40 rooms, Learning Stations, in the most remote areas of Turkey, where teachers cannot be sent because of terrorism. A few years later, these rooms were set up with computers, compact discs, and the Internet. Today, there are over 100 stations set up, which service over 600,000 children and adults.

The newest initiative for K-12 online learning, which began in September 2006, is the "Online Big Project" which was started by NGO's for students in grades 1-8. A private company developed 20 software- and simulation-based online courses for grade 4-8 students in Turkish, Math, Science, and Social subject areas for \$20 million, which was funded by a private businessman. Each course is aligned to the Turkish Ministry of Education's curriculum standards and contains 100+ lessons that can be completed in a blended learning environment over the course of one school year. The courses will service over 200,000 students in the pilot year and within three years will be used by over 11 million elementary and secondary students. 600,000 teachers will be trained online by almost 50 private companies over the next three years during the implementation process. These courses will be reviewed each year; however, currently no standards for online learning have been developed. The government is supporting this project by providing a computer for every twenty students, as well as broadband Internet connections in each of Turkey's schools.

In the future, Turkey hopes to expand the course offerings to vocational schools which currently service three million students. E-Learning provides a significant savings to the government for educating students in Turkey. The universities are working with private companies to develop online courses in order to make a profit. There is the potential of servicing over one million students in this area. The government's Open University has been offering courses via the television for the past 15 years. Six of their students are currently taking courses with New York State University in the United States of America; however, the cost is very expensive, keeping the enrollments low. The University in Ankra, another government sponsored institution, recently submitted a proposal and was approved to develop and offer online courses by the Higher Education Counsel. There is currently no master plan on e-Learning in Turkey; however, several educators and businesspeople in Turkey are excited about the potential of online learning and are working to integrate it into the education system. Schools have taken the initiative to develop their own courses, while others have purchased content from the private companies. The private businessmen have fully funded the K-12 endeavors due to formalities in the law and university students pay tuition for their courses.

Turkish businesspeople would like to work with a large software or Internet company as well as educators across the globe to create international courses in mathematics, science, and social studies to be offered to students all over the world at no cost. They believe the open courseware model from MIT is a future trend in e-Learning.

United Kingdom

E-Learning in the United Kingdom is relatively widespread in the university sector but is much less common in the K-12 school sector. The government, institutions, and faculty members are working together to develop content in the universities.

In May 2005, the Department for Education and Skills created the e-strategy: *Harnessing Technology: Transforming Learning and Children's Services* (<http://www.dfes.gov.uk/publications/e-strategy/>) to provide a master plan for the future of e-Learning in the U.K. Their goal is to build a common ground by bringing the education and children's services groups to a level of using technology effectively within the next five years. Within ten years, they want to build on the capabilities of their newly skilled workforce in order to become more ambitious and innovative.

The e-Strategy was designed to harness technology to the needs of children, learners, parents, teachers, careers, employees, and all of their stakeholders. Their six priorities include: creating an integrated online information service for all citizens, integrating online personal support for children and learners, building a collaborative approach to transforming teaching and learning, developing a quality training and support package for practitioners, building a leadership and development package for organizational capability in ICT, and to create a common digital infrastructure to support transformation and reform.

United States of America

K-12 online learning in the United States has been rapidly growing in each of the 50 states since 1996. E-Learning is administered by the government at the state, school district, and school levels. Online learning is offered in several forms, such as: full-time comprehensive schools, concurrent (students take additional courses in addition to their regular school day) programs, private and charter schools, hybrid programs, and activities within the school day. Virtual schools in the United States service students within their schools, districts, states, the United States, and some schools offer courses to students across the globe. These programs are funded in a variety of models such as the individual state's government on a per pupil basis or as part of the state budget, grants, student tuition, scholarships from the private sector, and school-based subscription services.

The North American Council for Online Learning was established in 2003 to serve as a resource to K-12 virtual schools in North America. The organization currently provides professional development, resources, research, and a community for practitioners and policy leaders of K-12 e-Learning from all over the world.

The most current report on e-Learning in the United States is the *Keeping Pace With K-12 Online Learning: A Review of State Level Policy and Practice*, which was put together by Learning Point Associates. It is available at <http://www.ncrel.org/tech/pace2/> and gives a synopsis of the current state of e-Learning on both a state and national level as

well as provides research for future trends in online learning.

Online course enrollments in K-12 virtual schools are growing by more than 30% each year for the past three years in the United States with over 500,000 total enrollments in 2005. Twenty-four of the fifty states and the majority of school districts and individual schools offer some type of e-Learning. These students enroll in online courses and schools for multiple reasons. Students in rural areas can access courses that might not be available at their school, assistance with home schooling, teacher shortages, credit recovery, early graduation, have to work full-time, to work at their own pace, and students who travel frequently for athletics and acting/modeling careers, or just curious about a new model of learning.

Online content is developed by corporate vendors, instructional designers and classroom teachers. It can be purchased, leased, and developed in house. There are no current national standards for content development in the United States. Several states and individual districts and schools have created individual online course development standards. The majority of online courses are aligned to national, state, and district standards for quality control in the majority of online programs in the United States. Individual states, companies, and schools identify and measure quality within their online programs.

Teachers are becoming highly qualified per the No Child Left Behind Act (<http://www.ed.gov/nclb/landing.jhtml>) in their content areas and are evaluated on local standards. Training is provided to online teachers by schools and vendors. Several virtual schools have developed their own, in-house training programs for teachers. Vendors sell training on the use of their course management systems and other software. Professional development is also provided in regional and national conferences sponsored by the North American Council for Online Learning as well as other national and local organizations.

Funding and national government support of online learning continue to be obstacles in the United States, as well as finding qualified teachers with the content knowledge, technology skills, and the ability to transfer their teaching skills into the online world. E-Learning leaders in the United States are continuously lobbying and educating state and national level government policy makers to understand the importance and future of K-12 online learning and how it can help redesign the current K-12 education system.

Zimbabwe

E-Learning in Zimbabwe has not been formally institutionalized. The National University of Science and Technology ICT department has installed a Learning Management System (LMS) on the University's server in an effort of introducing e-Learning. Teachers and Professors in Zimbabwe are working with iEARN and have managed to convince the University to allow them to pilot the use of the software on the University intranet. At this point in time, all of the lecturers and students in a few departments, which resulted in the development of an online learning pilot program.

Training is currently being developed for lecturers in the University. Zimbabwe is looking to collaborate with other countries on developing training for teachers and in designing an online education program. Their current focus is to continue using emerging and existing technologies.

Conclusion

Models for funding e-Learning, the process for content creation, and professional development for teachers have been successfully implemented in those countries who have implemented online lessons and courses.

However, the need for standards and measuring quality in online content is lacking in most countries. Australia, Canada, and Singapore have taken the lead in the development of these standards and measures of quality for their individual countries, and New Zealand is currently working with the IMS Global Learning Consortium to adopt international standards that can be used by countries around the world. SCORM standards have been implemented internationally; however, not all e-Learning programs are in compliance.

Providing access to computers and the Internet in smaller countries as well as the training on the use of these tools for both teachers and students will help expand e-Learning. In most countries, e-Learning tends to be available only to those students in urban areas which have access to the technologies or students in remote areas where countries are unable to provide teachers for few students.

As the summaries show, e-Learning for students in grades K-12 is rapidly growing across the world. Although this summary provides only a small snapshot of the current state of K-12 e-Learning across the globe, it does provide several exciting and promising approaches and trends for the future of e-Learning.