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Connecting, learning and collaborating globally — the Singapore scenarios

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The Present

As a nation, Singapore was connected to the Internet some time in 1991 when our National University of Singapore set up the TechNet Unit to connect the institutions of higher learning to the Internet. Since then, many online initiatives have taken root in Singapore. One of these is online learning. Online learning in Singapore can be said to have started something in late 1994 when Windows-based Web applications became popular and every organization rushed to put up their Website. The educational institutions were the first to adopt online learning. Initially, many online learning offerings were nothing more than putting up teaching and learning resources on a website. However, when learning management systems like TopClass, Blackboard and LearningSpace appeared in the market, these educational institutions started to put up course materials online. Even our National University of Singapore decided to develop their own Integrated Virtual Learning Environment (or IVLE in short). Right now every educational institution is using a learning management system to put up their courses online.

At the same time, when the IMS Project became known in late 1997 and early 1998, we became aware of the need to embrace and adopt international eLearning standards, especially in the areas of identifying learning resources, assembling and disassembling granular learning resources and assessment and progress tracking. In response, the IMS Asia Centre was set up. Many people became aware of the need to use eLearning standards in order to achieve interoperability of learning resources and reusability of the learning resources.

This is one reason why Singapore has decided to organize the ITSC (Information Technology Standards Committee) Plugfest 2002 in which there will be two domain areas. eLearning and the smartcard are the two domain areas. The eLearning Plugfest will cover the IMS Meta-data, Content Packaging and Question and Test Interoperability specifications.

However, our long-term direction is towards getting people to manage their own learning and thereby receiving personalized learning. Getting the eLearning companies, educational institutions and government bodies to agree on eLearning standards is just the first step in our long road towards personalized learning.

At the same time, many of our local institutions and other organisations have already begun online collaborations with students, scientists and researchers all over the world. For example, we have online collaboration projects in areas like building automation, rapid prototyping and in education projects like ThinkQuest.

The following positive trends have already emerged: international collaborations via the Internet, workplace elearning and performance support, government-industry collaborations, community networks and global strategic positioning.

As we become more connected, we will also become more vulnerable to several dangers such as virus attacks, disinformation on websites, hate emails and other forms of cyber terrorism. However, these will not be discussed in this paper.

So, what will the scenario on networked learning, online collaboration and the emergence of knowledge economy in Singapore is like, say, in the year 2020? This paper highlights two

possible scenarios.

The Future

Scenario One - The Government Initiated Approach

The first scenario is one in which many of the networked learning initiatives are started by the government. **I call this the government-initiated approach**. We think that by 2020, our government would collaborate more with the industry members to implement standards-based knowledge management systems instead of just learning management systems.

By then, we think that the major international eLearning standards consortia would have published and concluded specifications for eLearning content interoperability and reusability. There would be credible digital rights management systems to ensure that intellectual properties are well respected and enforced. Singapore would probably have an organization that would monitor and audit eLearning websites for quality and certifications for quality online learning websites will be instituted.

As we would probably have held several eLearning Plugfests by then, we envisage that many eLearning systems will interoperate and eLearning contents can be reused and repurposed for the learner's particular difficulty level. The issue is then not about technology but rather about sharing knowledge - i.e. how to encode knowledge and pass them to others who need them just-in-time and not just-in-case!

The usual constraints like globalization, zero time to market our products and services, day-one employee productivity, pressure to reduce costs and timeframes and the emergence of the "search-learning" generation or learners will always be there whether it is the year 2002 or 2020.

Many teachers, trainers and content providers would probably ask such a question: "Okay, I am using XXX eLearning standard, and I can make good Learning Objects, but how do I put them together to make the learning experience I want my students to go through?"

By 2020, many Singaporeans, who would have been very well educated by then, are going for online courses that offer rich learning experiences rather than going for online courses which provide just the information part.

Online learning would have to become an experience, not a chore any more. Just as the Internet has been around since 1969 but it was not until the Windows-based interface to the Internet became available in late 1993 that all sorts of interacting experiences were made available. Since then, we have web chats, Internet relay chats, video conferencing, peer-to-peer communications that teachers and trainers began to use for teaching and learning purposes. So much so that these technologies have now been very well accepted in the teaching and learning environment.

In addition, much progress would have been made in the area of eLearning architecture. The new eLearning architecture would be based on an adaptive architecture or personalized teaching and learning model. Through the collaborative efforts of projects like the OKI (Open Knowledge Initiative) and organizations like the IMS and the ADL, we find that we could capture and encode learning experiences in XML format. An example of this is the much talked about EML (Educational Modelling Language) that is developed by The Open University of the Netherlands. Learning activities can be encoded into IMS-based content packaging as extensions, for example. In this way, learning activities in specific domain areas can be encoded up and then passed on to other teachers and trainers.

We think that by 2020, networked learning would have been very well accepted. Perhaps largely because of the influence of the MIT's OKI Project, we begin to see much better learning as a result of better pedagogical design and better community support. Networked learning

systems would also be better designed and developed. There are also greater collaborations between educational researchers in Singapore with those abroad.

Yet another major area that would have had some success would be the eLearning content development area. We believe that new content models will appear where there is tighter integration of performance support and simulation.

We all know that content is "king" but content development takes too long, cost too much, and often result in poor instructional quality. We keep hearing the same set of problems: lack of standards, hard to reuse existing content in new development, requires special skills in authoring systems and finally, the online content is difficult to make changes once the content has been developed.

We believe that by 2020, there will be many software tools and systems available for the teachers and trainers to participate in content development, instructional design, media management, meta-data creation, content packaging, assessment and progress tracking to such an extent that these become transparent to the teachers and trainers. As it is already, one can use Authorware 6 to create SCORM-based meta-data XML records for labelling learning resources. There are also standards-based software tools that are Open Source Software based. Such software will reduce the total cost of ownership and it will definitely be a boon to school administrators as budgets are usually tight for schools.

Where previously we talked about setting up LMSs (Learning Management Systems), training administrators, by 2020, want to do more than just putting up lecture materials via the Internet. The administrative aspect of managing the training delivery processes, such as student registration, course administration, resource allocation, assessment reporting will always be there in the background. However, we believe that there will be new online learning systems that manage the entire teaching / training development processes. Such systems, (also known as Learning Content Management Systems), will take on more significance as people all over recognizes the importance of managing the student learning or staff training development processes rather than just the administrative processes.

The Learning Content Management System (LCMS) is a software system used to create, store, assemble, and deliver personalized e-learning content. So, where previously we have teachers and trainers developing and offering monolithic online courses, we see a paradigm shift from just content developers to knowledge or learning managers. They will use online course template engines to develop learning objects each of short duration (e.g. 2 - 5 minutes long). With these learning objects, the teacher will be able assemble (using the IMS Content Packaging specification, for example) just in time course modules to match the learning needs of individual learners.

By 2020, with Singapore doing more work on educational research in new modes of learning using IT, we will be able to implement more online student-centred learning, problem-based learning, gaming and simulation. Even for corporate training, with the development of competency models, such as those done by the HR-XML group, we will be able to implement better performance support systems for the various industry sectors like banking and finance, chemicals and electronics.

Equally important is the influence of the Open Source Software movement on networked learning. Partly because of the open collaborative culture of the Open Source Software community, we begin to see more people using Open Source Software to develop networked learning systems.

As far as online / networked learning is concerned, Singapore is well poised to try out new teaching and learning methods. The recent announcement by the Singapore's Ministry of Education that it "is investing S$48 million over the next five years to help the institute (i.e. the National Institute of Education) develop its research capabilities in literacy, the teaching of mathematics and science, and the use of information and communications technology." (Singapore's The Sunday Times, 27 Jan 2002) shows how committed our

Singapore Government is in making sure that Singapore stays ahead in online learning.

Scenario Two – Enterprising Singaporean Approach

The second scenario is one in which many of the knowledge learning initiatives are initiated by enterprising Singaporeans. **I call this the enterprising Singaporean approach.** Through the strategic encouragement schemes as initiated by the government bodies such as our Infocomm Development Authority of Singapore and the Productivity and Standards Board (to be known as Standards, Productivity and Innovation for Growth from 1 April 2002 onwards), many companies are formed where knowledge becomes the crucial factor for success. As it is at the moment, our Singapore Government is really encouraging many Singaporeans to be enterprising and strike out on their own instead of looking for salaried jobs or looking towards the government for directions.

As many of the knowledge management systems would have to be developed according to Singapore Standards (which are based on international standards), companies find it advantageous to use standards-based learning portals. The young and enterprising Singaporeans of today would have tied up with their counterparts in the US, UK, Europe, Australia, Japan, China, India and South Korea to offer interesting and educational knowledge systems especially for learning.

Some possible examples of collaborations are like subject-based courseware in Mathematics, Science, Languages and the use of ICT in schools. Another example is the possible collaboration between Singapore-based eLearning companies and those Australian companies involved in the development of SOCCI (Schools Online Curriculum Content Initiative) materials.

With Europe, we find possible collaborations with the Giunti Labs in Italy and the Sema Group of Spain. Other possibilities are collaborations with the CEN/ISSS Learning Technology Workshop members especially on areas like quality assurance of networked learning.

Another possibility is in the setting up of eLearning content factories. As an example, we could have Singapore-based instructional designers planning and designing courseware in Singapore. All the specifications and the storyboards are developed online. eLearning programmers and multimedia designers in China and India will do the actual development - i.e. doing the multimedia programming, the media production and the interactive scripting part.

Banking on the successful work of the MERLOT Project, Singaporeans collaborated with the partners in the MERLOT Project and set up digital repositories for language, mathematics and science courseware. One possible type of digital repository is the popular assessment type of questions for the primary and secondary school students. Digital repositories like this can then be made accessible to students from neighbouring countries.

There will also be self-policing mechanisms put in place by members of the local eLearning industry. These mechanisms will be put in place in order to ensure the quality of the courseware, the service provider and the mentoring process.

The two scenarios that I have painted are realistic. For Singapore to survive in the new knowledge-based economy, we need to position our future way of learning strategically. There has got to be more networked learning, collaborations and learning “just-in-time”. At the same time, we cannot expect our government to lead in everything. We also need to be entrepreneurial for otherwise there is no motivation to do better. Ultimately, we think that for us to reinvent the future we need to connect; we need to learn continuously and we need to collaborate globally.