E-learning in Australia and Korea: Learning from practice

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FOREWORD

Relevant and timely education and training is becoming increasingly important for individuals and for societies in the knowledge-based economies of the twenty-first century.

Over the last few decades the rapid growth and development of information and communication technology (ICT) has opened up opportunities for individuals and enterprises to access information and learning programs via the internet. E-learning, as it has been called, may provide some cost advantages for educational institutions and training systems. This is because it is not reliant on the physical infrastructure of classrooms required by traditional learning methods. E-learning can also increase flexibility of choice for individuals and organisations because learning is not limited by time or space. However, it does not on its own guarantee success. The way in which the teacher and the learner adopt and utilise the technology continues to be important.

This study compares e-learning in two countries, Australia and Korea, where, despite different policy frameworks and institutional arrangements, there has been a rapid expansion (by international standards) in the uptake of information and communication technology, and especially in education and training.

It is clear that, although e-learning used in isolation may not always be the preferred method of learning and/or teaching, it is here to stay. The challenge is to ensure that teachers and learners have the skills to use available technologies to maximise learning. This study has been a joint effort of researchers from two leading national research organisations in the field of vocational education and training in Australia and Korea.

We commend the researchers on this team for their hard work in completing this study.

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Key messages

✧ Both Korean and Australian governments have made conscious efforts to provide the information and communications technology infrastructure and funding required to promote and support e-learning in educational institutions and enterprises.

✧ E-learning provides immediate access to a wide array of resources and reference materials to assist in learning. It provides increased flexibility and opportunities for individuals who have historically found it difficult to access regular training and qualifications because of conflicting family, work and other commitments.

✧ However, availability of resources and financial incentives on their own will not ensure that individuals and enterprises will engage in e-learning. There is also a need to motivate learners, teachers and trainers to engage with e-learning by promoting its benefits, and providing them with the skills and resources they will require for effective participation. In Korea the availability of government incentives to enterprises should also be accompanied by a streamlining of accountability processes.

✧ There are common teaching/learning issues for Australian learners, teachers and trainers and their Korean counterparts. These mainly relate to motivation to engage with the technology, development of skills in using the technology, and access to timely assistance.

✧ Administrators in educational institutions should also acknowledge the considerable amount of time it takes teachers to develop and maintain relevant, suitable, accurate and up-to-date, web-based learning and assessment resources, and provide timely and appropriate feedback to students. This time should be accurately reflected in teacher work schedules and working conditions.

✧ The costs associated with the production of customised or commercially produced learning materials can be significant. However, in Korea the costs are further exacerbated by the need for all materials from other countries to be translated into Korean.

✧ Australia has in place formal standards for dealing with copyright and privacy issues. Such concerns have yet to be addressed in Korea.

✧ E-learning used in isolation is not widely observed in Korea and Australia. Both e-learning and traditional learning approaches can and will continue to exist side by side as viable learning approaches. The real challenge is to ensure that each can enhance the other to provide learning that meets the needs of individuals and organisations.

Executive summary

There is increasing demand for affordable, accessible and timely education and training. The rapid growth, availability and uptake of information and communications technology (ICT) over the last two decades has opened up opportunities for the promotion of e-learning to help governments meet these demands.

E-learning in this study refers to learning which is facilitated by electronic technologies. This includes courses or components of courses that are provided online.

In this study we compare the experiences of two countries which have facilitated the implementation of e-learning by driving national policy agendas to ensure that citizens, enterprises, government agencies and educational institutions engage with online technologies. The primary aim is to increase our understanding of political interventions, and practical issues faced by organisations, practitioners and learners when engaging in e-learning.

This report is organised into six separate chapters which deal with arrangements for the two countries.

In Chapter I, we set the context by emphasising the importance of e-learning for the knowledge-based economy. We also present a brief overview of major differences between the Australian and Korean arrangements for e-learning. This chapter also details the purpose of the study and organisation of the remainder of the report.

In Chapter II, we review policies and strategies adopted by Australian and Korean governments to create the appropriate environment to enable the development of e-learning. In Australia, these include the Strategic Framework for the Information Economy, and associated national and state and territory action plans for education and training for schools,

universities and vocational education and training (VET) sectors. It also includes the establishment of web-based services like www.education.au and EdNA (Education Network Australia) Online. In Korea, the National Informatization Framework (NIF), represents an endeavour by the Ministry of Information and Communication to build information and communication technology infrastructure in Korea. In addition, the Korean Government has also provided support for information and communication technology education of students at all education levels, but in particular for those at primary and secondary education. The Ministry of Education and Human Resource Development has legislated for the establishment of cyber-universities whose main purpose is to provide higher education programs via e-learning. The Ministry of Labour has implemented the Employment Insurance Reimbursement Policy to encourage uptake of e-learning in Korean enterprises.

In Chapter III, we present statistics on the uptake of information and communication technology in Australia and Korea. Although both countries are highly ranked against Organisation for Economic Co-operation and Development (OECD) comparator countries on various information and communication technology statistics, Korea has shown exceptionally rapid growth in terms of internet access and internet usage. Its performance has placed it among the leading countries in this area.

In Chapter IV, we discuss findings from existing research and case studies which help to improve our understanding of the implementation of e-learning in Australia and the issues associated with teaching and learning processes. It is clear that both teachers and students need motivation to engage with the methodology, and require appropriate skills and resources to participate effectively. However, it is also clear that the research findings are mixed about the effectiveness of e-learning strategies in terms of educational achievement. The information provided for Korea in this chapter adopts a macro-perspective in terms of policy directions and the expansion of e-learning in primary, secondary, and higher education, online universities and colleges, corporate training and general public education. Support for these findings are provided by the results from case studies presented in Chapter V.

In Chapter VI, we provide conclusions for the study. To this end we make the following general observations. We conclude that the implementation of e-learning in Australia and Korea must be understood in terms of different starting points and approaches to government intervention. Despite these differences, both countries have displayed substantial endeavours to provide infrastructure, funding and resources to make it possible for e-learning to grow and prosper. In addition, high levels of internet access and usage means that individuals are also in a position to participate in e-learning. However, the implementation of e-learning in educational institutions and organisations, raises similar practical issues for teaching and learning in both countries. These relate to student and teacher motivation, and their confidence and skill in using the technology. It also relates to the ability of on-line methodologies used in isolation to provide effective mechanisms for providing and recording feedback to students, and for providing effective communication channels between students and their peers and their teachers. The need for administrators to provide appropriate recognition of the changing patterns of work for teachers is also another major issue for training systems.

It is clear that government intervention in the form of funding initiatives in Australia or specific legislation and funding initiatives in Korea have driven the expansion of e-learning. However, the proportion of programs which are solely delivered online is low in Australia, and although the proportion of such programs is much higher for Korea (especially in corporate training organisations and cyber-universities), there is an increasing preference and acknowledgement in both countries of the benefits provided by a blended learning approach.

Although the cost of development and production of e-learning materials is an issue for Australian and Korean organisations, it seems to be more serious for Korea. This is because any materials that are purchased from other countries must be translated into Korean. However, Australia has the benefit of purchasing materials from other English-speaking countries.

The shortage of human resources specialising in e-learning is also another major problem in Korea. In Australia this situation has been addressed in part by providing training in use of new technologies, and the

development of strategies to facilitate online learning for existing teachers and trainers. Strategies for recruiting overseas specialists in information technology have been aimed at the increasing expertise for the ICT industry

Although copyright and privacy are issues of importance for all countries, legal procedures have been established to address the development and implementation of copyright and privacy standards in Australia. These issues have yet to become significant concerns for Korea. Although there have been cases where breaches of copyright have been successfully re-dressed in Australia, the policing and enforcement of these laws remains difficult.

To sum up, there are common teaching/learning issues and concerns faced by teaching practitioners and learners in Australia and Korea. There is also a realisation in both countries that e-learning cannot, on its own, meet the needs of all learners, organisations and institutions. However, it is also clear that there is a place for e-learning in modern societies where the availability of advanced ICTs makes it possible for learners and their teachers and trainers to access considerable internet resources to enhance learning in whatever form it takes.

In some ways e-learning has helped to satisfy societal concerns for improving access and equity for citizens. It has helped to provide second chance opportunities for adults who in the past have been denied access to training and qualifications because of conflicting schedules with work and family commitments, or because physical disabilities have prevented them from engaging with regular classroom training. However, there continue to be concerns about access to adequate resources for students from disadvantaged groups in Australia, and effectiveness of infrastructure for those in rural areas. Increased flexibility for all learners to choose when and where they undertake their training also makes e-learning a viable methodology for all citizens to engage in education and training throughout their life time.

However, it is also clear that, despite the benefits that organisations and individuals derive from using the internet for accessing education,

government and business services, and other information used for learning, e-learning cannot be expected to meet the needs of all learners. We have found that in some cases and for some individuals it can successfully replace traditional methods of face-to-face delivery. In most cases it needs to be combined with face-to-face training and support to ensure that learning is effective, and that learners do not feel isolated from teachers and from peers. The evidence is also mixed about whether it provides less costly training and whether it leads to better academic achievement or learning outcomes than traditional forms of learning. Nevertheless, both e-learning and traditional learning approaches can and will continue to exist side by side as viable learning approaches. The real challenge is to ensure that each can enhance the other to provide learning that meets the needs of individuals.

I. Introduction

Background to the Study

E-learning in the knowledge-based economy

The provision of quality education and training which is also cost- and time-efficient is especially important for governments in new knowledge-based economies. It is generally believed that it can help them to improve the quantity and quality of their workforce to enable them to participate more effectively in global markets. There is also a view that individuals are more likely to engage in education and training if it is less costly and can be accessed at times that suits their particular lifestyles.

The rapid growth in information and communication technology (ICT) over the last few decades and utilisation of this new technology in the education and training sector are opening up these possibilities for governments and for individuals. Although ICT has been well utilised in other government services and in commerce, the application of ICT in education and training has received special attention (OECD 2001).

Although advances in ICTs have helped to create the infrastructure required for the promotion and delivery of e-learning, they cannot be solely responsible for the success or otherwise of this learning approach. The extent to which the teacher and the learner can use the technology available, and the extent to which the learning environment is able to facilitate learning are more important. While early studies of e-learning tended to focus on the application of technology, today researchers are focusing on the development of curriculum content, and the engagement of users.

Comparisons of the way e-learning has been applied in different countries, even if such countries do not share identical socio-economic and cultural characteristics, can also provide important information. It can

identify government strategies and policies and teaching and learning approaches that have been successful or ineffective. In so doing, such comparisons can help countries evaluate their own approaches to policy-making and implementation.

This study looks at the development and provision of e-learning in two countries, Australia and Korea, where e-learning is expanding quite rapidly and successfully. It explores how governments of countries with differing socio-economic environments and cultural traditions have gone about creating the infrastructure and environment required for successful application of new technologies to learning.

It also attempts to compare e-learning in Australia and Korea by looking at e-learning systems in both countries and the e-learning practices of major corporations and educational institutions.

Advantages of e-learning methodologies

Rapid advances in telecommunications and information technology and ease of access to the internet for many students and providers have made it possible for education and training institutions to offer courses, learning materials and course administration and student management systems online.

Here, e-learning refers to electronic learning, that is, learning acquired via information and communication technologies. In this study we use the term to describe online delivery and computer-facilitated learning that may or may not be supplemented with face-to-face support. Its importance as an area of study is its increasing availability as a delivery option for institutions and enterprises, and learning option for students and employees.

Typical online learning tools currently being used in e-learning programs provide students and teachers with the ability to communicate with each other in real (synchronous) or asynchronous time. These tools also enable them to send and receive email and attachments, and post, view, and print calendar entries. They enable students to view and access course materials, syllabuses, and image and other databases. In addition, students

are able to submit assignments online and view assignment results. Students may complete and submit quizzes, and undertake self-tests that do not require submission. There are also a variety of study tools which help students to file frequently used pages and materials, check relevant references, and search relevant courses and words. There are also tools to enable students to take notes, make class presentations and create their own home pages.

The growth of e-learning has been assisted by increased access to technologies that make this possible, and the willingness of students to participate in this form of learning. This is especially the case for Australians with higher educational attainment (National Office of Information Technology 2003). Stuparich (2001) also reports that access levels for Australian university students appears to be higher than for the general population, with 95% of university students indicating they regularly use ICT for learning.

Demand for e-learning in Australia has also been driven by increasing rates of students who are in full-time or part-time employment, and full-time students who need to be in paid employment to pay for their living and studying expenses. As such they cannot avail themselves of regular classroom participation. The willingness of teachers to participate in this form of training has also driven up demand. Increased demand for education that is more accessible, flexible and customised to client needs is also encouraged by strategies that promote the benefits of such learning.

A variety of perceived benefits are used to encourage students to undertake e-learning programs. For example, there is a view that students will be able to complete courses in less time. Because they will have better access to high-quality resources and information, they will not be required to purchase expensive textbooks. In addition, students will benefit from greater flexibility in assessment, and greater control of their learning. Furthermore, students will be able to communicate online with other students and teachers. E-learning also offers greater flexibility to students with a disability.

There are self-development benefits for both students and teachers. Both groups will improve their skills in using and understanding information technology. Teachers will hone their skills in writing simply for the online audience, and moderate sessions and mentor students online. Students will improve their literacy and interpretation skills through practice in the online environment and develop skills of time management, independent learning and problem-solving. Where there are opportunities to work with others, students will be able to develop teamwork skills.

Australian situation

Australia has the infrastructure in place to enable considerable implementation of e-learning in schools and institutions of further education, including universities, community colleges and technical and further education (TAFE) institutions, and enterprises providing training for employees. For example, the Australian Bureau of Statistics (ABS 2003a) reports that by the end of the March quarter 2003, there were 5.1 million internet subscribers nationwide, with 4.1 million (87%) of these being household subscribers, and 659 000 being government subscribers. In the second quarter of that year there were 55% of households with internet access, an increase of 50% over 2001 figures. In addition there were 58% of Australians who had immediate internet access. This included 59% of those aged 14 years who had access at home, at work or other location. Among Australian businesses, computer usage has risen from 49% of businesses in 1993–94 to 84% of businesses as of June 2001. In addition, the percentage of businesses with internet access has risen from 29% in 1997–98 to 69% in 2000–01 (ABS 2003b).

The National Office for the Information Economy (2003) presents data to show that in Australia internet participation is also related to educational attainment. Between June 2001 and 2002 internet usage increased for all groups regardless of educational attainment. However, 85% of those with university degrees used the internet compared with 64% of certificate holders, 61% of upper-secondary school completers, and 40% of those with primarily an elementary school background.

When online activities are broken down by activities and location of access, there were 19% of the 6.8 million Australians living in metropolitan areas, and 17% of the 2.8 million Australians in non-metropolitan areas who had used the internet to access education services (National Office for the Information Economy 2003).

The secondary school participation rate of students aged 15, 16, 17 years at 1 July 2002, was 92.5%, 80.9%, and 62.3% respectively. In 2001, some 87% of all full-time secondary school students remained at school until Year 11 and 73% remained in school until Year 12. However, these figures do not take into account students in these age groups who moved into other education and training institutions.

In terms of reading literacy (OECD 2003), Australian 15-year-olds score well above the mean for 15-year-olds in Organisation for Economic Co-operation and Development (OECD) comparator countries. The World Fact Book (Cental Intelligence Agency) reports that Australia has 100% literacy rates for both males and females 15 years of age and over. However, more detailed surveys of different types of literacy indicate that there is a substantial minority (6.6 million) of Australians who are likely to experience difficulties in using printed materials found in daily life and work. There are also claims that 50% of all adult Australians may not have the literacy or numeracy skills to participate effectively in the knowledge economy (Falk & Guenther 2002).

In Australian universities and vocational education and training (VET) institutions, e-learning has developed from the print-based distance learning or external studies programs available to students living long distances from such institutions. However, it has become more prominent in both sectors with increasing availability and access to new information and communication technologies. In the VET sector, e-learning as a methodology was seen as one way to make training more accessible, flexible and technology-based. Improving access to training was considered to be especially important for increasing training participation among existing workers who may not be able to attend training at regular times, and disadvantaged groups who had historically not participated in training. Increasing the flexibility of training was also considered to be especially important for public providers who wanted to ensure that they

maintained their client base in the context of the opening-up of the training market to private providers. The use of advanced technology (mainly ICTs) was considered important, firstly to prepare students for the new workplaces, and also to enrich delivery and content of training programs.

Increasingly, e-learning options are becoming available to and taken up by on-campus and off-campus students. There is also a trend for on-campus students to avail themselves of distance learning and e-learning materials (Stuparich 2001). There is also a perception that e-learning can reduce the costs of training delivery because overheads such as classrooms and other physical infrastructure are no longer required.

Korean situation

The development of e-learning in Korea is strongly related to the rapid growth of its internationally recognised ICT industry. During the last four decades, and especially in the last ten years, the country has made major strides in developing its ICT industry. In 1995, Korea had less than one internet user per 100 inhabitants. In 1999, it surpassed the current national average in internet usage, and by the end of 2002 it had become the world's fifth largest internet market with around 26 million users. Today South Korea is heralded as a leading example of a country that has moved from providing low levels of ICT access to one providing among the highest levels of access in the world.

South Korea's high literacy rate, at 97.6%, also provides favourable conditions for the development and uptake of e-learning. The fact that most people can read the language facilitates their use of the internet. Korea's school enrolment rate is very high. It has an average of 90% at the primary, secondary, and tertiary levels combined, with 68% at the tertiary level alone. This also provides a favourable environment for the growth of e-learning methodologies. Companies in Korea are increasingly depending on e-learning strategies to train their employees and to improve their skills to meet the needs of the workplace.

The internet and other computer applications have increasingly become the more popular tools for learning. While the country has been recently

equipped with the infrastructure required for e-learning to grow and prosper, the government has also played a major role developing and implementing policies aimed at promoting e-learning in educational institutions. At the school level, the government has encouraged and supported primary and secondary schools to provide computer education to students. In addition, the government has enacted a law establishing 'cyber universities', a unique feature of higher education in South Korea. The South Korean Government has also adopted a policy of providing a financial incentive to companies who engage their employees in e-learning. This financial support is in the form of monies collected from a training levy.

Although such an environment is a necessary condition for promoting the uptake of e-learning in South Korea, the introduction of new learning mediums and delivery methods requires the passage of time before promised benefits can flow to users. A useful starting point is to gradually enhance traditional forms of learning by introducing the use of electronic applications.

E-learning is a relatively new way of learning in Korea. For this reason further research into the strengths and weaknesses of the system, and strategies for improvement are required.

Purpose and outline of the study

The purpose of this study is to compare the implementation of e-learning in Australia and Korea in order to identify successful and unsuccessful government strategies, policies, and teaching and learning approaches. The study attempts to examine approaches to the implementation of e-learning in both countries with a view to providing some practical examples of effective practice to inform the further development of vocational and further education and training. To do so, it will draw on government policy, national statistics, and existing research, and findings from case studies of e-learning in universities, TAFE colleges, and enterprise training organisations. Appendix A provides a sample of the questions that guided the collection of data from in-person and telephone interviews and self-reports.

In the following sections we provide a brief overview of the major policies which have supported the uptake of ICTs in general and in education and training. We also present statistics on the uptake of ICTs in Korea and Australia. An overview of existing research helps us to evaluate the effectiveness of e-learning and the issues that still remain. We also present and analyse findings from case studies conducted by the researchers. Finally, we make comparisons between findings from both countries and make comment on the way forward.

II. National policy frameworks

Australia

The Australian Government has taken a lead role in creating the appropriate environment for all Australians to have access to, and benefit from, what has become known as the information economy. The government has dedicated to taking advantage of the opportunities provided by the 'information age to improve all Australian's living standards … and to … enhance our competitiveness in the global information economy' (National Office for the Information Economy 2002).

Creating the information economy

In 1996 the government established the Online Council to address issues that required joint Commonwealth, state and local government action. This resulted in the establishment in 1997 of the National Office for the Information Economy. This office represented a whole-of-government approach to online activities. It was also charged with over-viewing the legal and regulatory environment for domestic online activities, national participation in major international forums for global governance of online services, and the implementation of online technology for government services. In 1998 the government launched its strategic framework for bringing Australian into the information age.[1]

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[1] This framework was the Strategic Framework for the Information Economy—Identifying Priorities for Action.

The framework highlighted how the internet could be used to reduce difficulties posed by Australia's distance from major international markets. It emphasised the need for a national approach to promoting the country's interests in world forums. It also underscored the philosophy that all Australians should have access to, and benefit from, the information economy and that government should take a lead role in creating the appropriate environment. However, the private sector was expected to take a leadership role in investment and market development.

Major priorities included promoting confidence in the use of online technologies, increasing Australia's online presence, and developing the country's ICT industries. In terms of education and training, the framework was committed to enabling all citizens to benefit from online technologies, and to producing high-quality information professionals with up-to-date skills.

There were also strategies for awareness-raising initiatives to promote the benefits of online technology for mainstream and Indigenous communities, and to provide information on where the public could access the technology. ICT-related activities and infrastructure measures were incorporated into other major social policy initiatives, including those related to the wellbeing of families, regional and Indigenous communities, and provision of access for special groups and the underprivileged. Strategies also included ICT initiatives for the acceptance of global standards and guidelines, and for the provision of effective education and training. A summary of the government's policies, programs and progress in developing an information economy based on the National Office for the Information Economy (2002) report appears in appendix B.

In 1997 the Australian education and training ministers established a national ICT agency (<http://www.education.au>) to help education and training organisations 'meet the challenges' of the internet and the information economy. This agency provides a comprehensive range of services and capacities for use by education and training systems in Australia. These include EdNA Online services and projects, a career information site (<http://www.myfuture.edu.au>), and the national portal for government services (<http://www.education.gov.au>). It is also

involved in a variety of international forums to ensure that Australian interests are considered in the development of 'inter-operability' of ICT standards and specifications relevant to education and training.

The Education and Training Action Plan for the Information Economy (also called Learning for the Knowledge Society) was endorsed in 2000. This action plan comprised plans for each of the educational sectors (schools, universities, and VET), specifying five separate areas for action (people, infrastructure, online content, applications and services, policy and organisational framework, regulatory framework). A fuller description of the activities associated with these areas appears in appendix B. The school sector is serviced in part by the Ministerial Council on Employment, Education, Training and Youth Affairs (MCEETYA) Taskforce for Information and Communication Technologies in Schools. The VET sector is serviced by the Flexible Learning Advisory Group, and the higher education sector is represented by the Council of Australian University Directors of Information Technology. The Australian Information and Communications Technology Council provides advice on collaborative activities across the sectors.

The national framework and education plans were then reflected in state and territory frameworks and policies. For example, Connecting Victoria, Communication and Information Strategic Plan, Information Economy 2002, Skilling People for an Information Society, and Intelligent Island comprise responses to the national strategic framework for Victoria, Queensland, South Australia, New South Wales and Tasmania. These states opted for whole-of-government approaches to preparing citizens for the new millennium. Today each of the states and territories has continued to develop individual specific approaches to ensuring the development of appropriate ICT skills, environments and infrastructure.

In April 2004 the Australian Government established the Australian Government Information Management Office (AGIMO) to replace the National Office for the Information Economy. It took over the latter's functions related to the promotion and coordination of new ICTs to deliver government policies, information, programs and services. The work of the Australian Government Information Management Office also

includes research on e-government issues, including governance, security, authentication and investment. National Office for the Information Economy functions related to broader policy research and programs have been transferred to the Office for the Information Economy in the Department of Communications, Information Technology and the Arts. This office will implement the National Broadband Strategy and the Higher Bandwidth Incentive Scheme and will deal with strategies to implement the Span Act 2003, and pursue bilateral and multilateral arrangements to reduce spam. The Office of the Information Economy will monitor and investigate access to the internet by communities, and deal with matters of e-security, e-business. It will represent Australian interests in international forums.

Strategies for online education and training

In 1995 the Commonwealth Government established the already mentioned gateway to educational and training resources and services: EdNA Online (Education Network Australia). This gateway was organised around Australian curriculum and provided a directory for education and training in Australia (that is, lists of courses according to institutions). It also provided a database of resources which are useful for teaching and learning. These tools are free to Australian educators. Today EdNA Online has over 165 000 quality-evaluated resources and 323 000 linked resources (February 2003).[2] At the same time it also provided funding for internet connection and professional development opportunities for teachers.

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[2] This website now receives nearly three million hits per month, representing a 66% growth over the past three years. EdNA Online is currently positioned as a key service point for the Australian digital community in education and training, having a number of specialist collections of resources relating to national online initiatives, and establishing a modern, technical online architecture. EdNA Online has also hosted online events for the world congress in information technology and the global summit of knowledge networks. The future for EdNA Online involves strengthening the role as Australia's main resource and leader in the education and training sector for e-learning.

In April 1999 the Ministerial Council on Employment, Education, Training and Youth Affairs (1999) revised its national goals for schooling for the twenty-first century. The revisions stated that: 'when students leave school they should … be confident, creative and productive users of new technologies particularly information and communications technologies and understand the impact of those technologies on society'.

Such a mission laid the foundations for an education and training strategy[3] which urged the development of a national approach to policy development regarding ICT skills formation and e-learning. As already noted, each of the states and territories adopted a separate but broadly similar focus for all Australians to acquire appropriate ICT skills and access online technologies.

The national education and training action plan listed how the nation would go about improving education and training for the information economy. This was to be done through the production of appropriate online instructional content, application and services, and the provision of affordable and reliable ICT high-bandwidth infrastructure for the education and training sector. Funding was also to be provided for innovative programs to develop and foster ICT, mathematics, science and technology skills and for the establishment of a centre of excellence to provide postgraduate research and training in the ICT area. Skills were also to be imported by the recruitment of migrants with required ICT skills.

The plan also included strategies for the implementation of common technical standards, and the definition and implementation of a regulatory framework for copyright exemptions and management. It also meant increasing collaboration between government, industry, and providers regarding service provision. A national approach was also important for the benchmarking of Australian performance with comparator countries. Details on the specific initiatives for education and training are provided in appendix B.

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[3] This was called 'Learning for the Knowledge Society: An education and training action plan for the information economy'.

A commitment to have all government services online was also made. Today there are nine portals enabling customers to access 24-hour online government services. These include portals for community, families, regional Australians, youth, agriculture, culture and recreation, education, science and industry, and workplace. In addition, there are websites providing up-to-date information, online access to facilities, and advice on a variety of services. These include job vacancies (Australian Jobsearch), health (HealthInsite), Commonwealth and state and territory government services (Business Entry Point), tax lodgement facility (e-tax), and grants available from all Commonwealth agencies (Grantslink).

Australia ranks favourably with comparator countries in relation to readiness for e-business (Economist Intelligence Unit 2002 cited in National Office for the Information Economy 2002). For example, in 2002 Australia was ranked sixth on e-readiness rankings among 60 comparator countries. It was ranked first in 'legal and policy environment'.

Funding initiatives

In 2001, the Australian Government contributed A\$34.1 million to developing, over five years, interactive online curriculum for schools. This was to be matched by the states and territories. This meant that a total A\$70 million was made available to develop high-quality digital educational content. This money was to be spent on a number of initiatives, namely the integration of information technology into schools, and opening up access to students in regional and remote Australia.[4]

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[4] The National Aboriginal and Torres Straight Islander Education Policy (AEP) is a program designed to ensure that Indigenous students and communities also gain skills in ICT. Some examples of these include School of the Air, I-School North Queensland, Teacher Training and Support using the Internet—the Yalata and Oak Valley Experience (South Australia).

Providing ICT skills for teachers and students

Strategies were implemented to provide for the professional development of teachers in the digital medium and the integration of information and communication technology skills into school life. Plans were also made to provide affordable access to ICT infrastructure (such as 'Computers for Schools') and development of online content in the school sector (known as 'The Le@rning Federation').[5]

National collaborative investment and energy was also applied to developing the Australian VET sector's capacity for flexible learning and especially for applying new technologies in teaching and learning and in other organisational support services and processes. This initiative is called the Australian Flexible Learning Framework. Since 2000, about $80 million have been invested in this initiative by the federal government and state and territory governments, with 41% of the funds going to the professional development of teachers and trainers in the VET sector (including private and adult and community education [ACE] providers). In addition, about 42% of the funds have been applied to the development of online content, applications and services. Online and physical resources have been developed to support national curricula and industry training packages. Other funds have gone to other projects

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[5] The Le@rning Federation is a program initiated by the state governments and the federal governments of New Zealand and Australia. It is a joint venture between education.au and EdNA Online, and aims to develop online interactive curriculum content for Australian and New Zealand schools. It is also set up to provide professional development in ICT for teachers. The documented objectives for appropriate ICT content deal with educational soundness, accessibility issues, technical requirements, and management of intellectual property. A major innovation will involve the development of a system that will enable the control and tracking of intellectual property through the lifecycle of the content. Through this service, the Le@rning Federation is set to be a leader in the development of digital rights management.

dealing with access to bandwidth, inter-operability, learning object repositories, copyright and legal issues.

Privacy and copyright issues

The two main ethical concerns with e-learning are privacy and copyright issues. The questions of who owns the materials placed on the web, and who is able to access such material are major issues for all societies. In Australia, the Office of the Federal Privacy Commissioner deals with internet privacy issues. There are three main guidelines for federal and Australian Capital Territory Government websites, including sites dedicated to online learning. The most relevant states that 'Agency Websites should incorporate a prominently displayed Privacy Statement which states what information is collected, for what purpose and how this information is used, if it is disclosed and to whom and addresses any other relevant privacy issues'. Applying a confidentiality principle to an institution supporting e-learning might therefore include publishing a clear and honest privacy statement on their website, to notify users of what information is being collected, how it is stored and how it might be used. Online learners should know who has access to the virtual classroom and what defines their private communications.

Ownership and copyright issues regarding teaching materials (exercises, lecture notes); video and multimedia; and curriculum strategies created by the academic or web developer rest with the institution. These can be dealt with by copyright statements.

II. National policy frameworks

Korea

In the previous chapter, we saw that the Australian Government has played an important role in developing ICT in Australia. The role of government initiatives in Korea has been even more crucial to the rapid development of ICT in general, and to the promotion of e-learning in particular. The Korean Government has set up specific plans to turn the country into an information society in a short period. In this chapter, we review key initiatives of the Korean Government to boost the development and uptake ICT in Korea. We also discuss special policies taken by the Ministry of Education and Human Resource Development (MEHRD), and Ministry of Labour in Korea to promote e-learning in Korea.

National strategies to enhance ICT in Korea

There is general agreement that the rapid development of ICT in Korea and the fast penetration of ICT into public and private sectors emanate from the policy push from government. In Korea, the influence of the government on private sectors is strong. For instance, private companies have been quick to accept and implement the basic guidelines for ICT established by the Ministry of Information and Communication. In addition to providing a supportive environment for the effective development of ICT, the Korean Government has also implemented more direct interventions. For the last 15 years, there have been at least six major government programs aimed at improving the status of ICT in Korea. Among these programs, the most outstanding is the National Informatization Framework (NIF) established in 1996. This program set out the roadmap for Korea's future information technology development.

The Korean Government has adopted a three-pronged approach to intervention. First, it has created the right environment for the development of ICT mainly by establishing pro-market policies of liberalisation and privatisation of the ICT industry. Second, it has intervened at the non-market end of the supply chain through the funding of the public internet backbone, which is, the Korean Information Infrastructure (KTI). Third, it has intervened at the non-market end of the demand chain, by providing information technology training for about ten million Koreans, including homemakers and those who are the employed in government agencies, in the army, and in schools. These policy efforts by the government are targeted turning Korea into an 'information society'.

To note again, the success of Korea's ICT sector is in large part due to the policy directions that the government has adopted. Among the key policy initiatives of the government are efforts to promote universal access. With Cyber Korea 21 launched in 1999, the government declared war against the digital divide. The 2002 *Act on Closing the Digital Divide* includes the establishment of the Korea Agency for Digital Opportunity and Promotion (KADO) as well as the Digital Divide Committee. As part of this digital divide project, 500 000 primary and secondary school students from low-income families participated in extra-curriculum computer courses during 2000 and 2001. In addition, 50 000 low-income students with good grades received a free personal computer with a free five-year internet subscription.

Outcomes of the ICT initiatives

The outcomes of the government initiatives to promote ICT in Korea can be clearly observed at different school levels and in different sectors.

Every primary and secondary school in Korea has access to the internet. By 2001, all were equipped with a Local Area Network (LAN), at least one computer lab and access to the government network, PUBNET. At the primary and secondary education level, Korea's schools are well endowed with ICTs. In 2000, the student to PC ratio was 17 to 1. Currently about half of all schools have a network connection with a speed of at least two Mbps. Every student begins computer education

from primary school by taking compulsory ICT courses of one hour per week. Middle schools provide three hours of optional ICT training a week and high schools provide two hours per week.

As in other countries, the higher education sector is a pioneer in computer networking in Korea. Korea's universities are connected to the Korean Education Network (KREN). KREN connects all public universities, some private ones and other educational institutions such as high schools. Also, at the higher education level, there are online universities, also called cyber universities, which were first established in March 2000. Among the nine cyber universities that opened up in 2000, four offered purely online courses, while the others provided offline courses.

Special initiatives to promote e-learning

The fast development of e-learning in Korea draws on the rapid development of ICT that is heavily supported and funded by the government's ICT policies. However, more directly, the rapid diffusion and growth of e-learning in Korea is attributable to specific government policies to boost e-learning. In addition, a specific set of government policies, adopted in particular by the Ministry of Education and Ministry of Labor, whose major function is to develop human resources, have also been influential.

In 1996, the Education Reform Committee, established as an advisory committee by the Ministry of Education and Human Resource Development, made a recommendation to the government to introduce cyber universities in Korea. Accordingly, the Ministry of Education and Human Resource Development in Korea opened up possibilities for the establishment of cyber universities on a trial basis. These 'cyber universities', were renamed 'distant universities' in line with a new Ministry of Education and Human Resource Development law on establishing online universities. In 2000, Ministry of Education and Human Resource Development amended the *Lifelong Education Law* to include a new clause to legally approve the establishment of online universities along defined standards. It is worth noting that the article related to establishment of online universities is not part of the *Higher*

Education Law which governs the establishment and operation of higher educational institutions. Instead it is part of the *Lifelong Education Law* which mostly governs the establishment of diverse lifelong educational institutions such as lifelong learning centres attached to universities. This is to facilitate the establishment of online universities, because the standards are less strict for educational institutions classified as lifelong learning educational institutions than those for higher education institutions. Once established, the online universities play an important role in providing the adult population with opportunities to obtain a degree in higher education while working or remaining at home. In our case study, cyber universities are selected as cases for detailed investigation.

Another important government initiative aimed at promoting e-learning has been introduced by the Ministry of Labour in the form of internet correspondence training courses (ICTC). This has contributed to the expansion of e-learning in corporate training. The internet correspondence training courses is part of the Employment Insurance Reimbursement Program which is administered by the Ministry of Labor. Under this scheme, companies that provide e-learning to their employees (either by providing training directly or by commissioning their training to the other institutions), receive a financial incentive for providing such programs to their employees. As the amount of money companies receive is considerable, it can act as an incentive to expand e-learning for the company. The implementation of this incentive along with the development of ICT infrastructure in Korea, has increased the number of existing workers receiving e-learning instruction to meet the company training requirements. The e-learning case study organisations selected and interviewed in Korea for this study (which we will review later in this report), also helped us to identify the impact of this program on corporate training.

III. Uptake of ICT

Uptake of ICT in Australia and Korea

Before any country can embark on a program of e-learning for citizens in general, and students in particular, there must be sufficiently developed infrastructure to enable this to occur. This means citizens need access to the internet and to computers in the home and at their place of learning. In this section we will discover that Australia and South Korea have the 'beginnings of the necessary infrastructure and critical mass of people actively online' to benefit from the developing information economy. For example, Australia and South Korea were ranked highly on a summary ranking table prepared by the Australian National Office for the Information Economy (2002) and although Australia was ranked in third place behind the United States of America and Sweden there was just a 5.2 point difference between the two countries. South Korea was ranked in 8th place on this summary table. However, in terms of speed of connection to the internet and hours spent per week in internet sessions, South Korea was ranked first among comparator countries.

Internet access

It is clear that Australian and South Korean households have high levels of computer usage and internet access. According to the National Office for the Information Economy (2002), as of September 2001, there were 67% of households that owned or leased a computer in Australia compared with 70% of such households in South Korea. These figures placed South Korea in first place among comparator countries selected for their high adoption of ICTs and relatively high income and education levels (including Australia, France, Germany, Hong Kong, Ireland, Italy,

Norway, New Zealand, Singapore, Sweden, Taiwan, and the United Kingdom).

There were also 97% of Australian households with a fixed telephone line compared with 99% of South Korean households with a fixed telephone line. Norway and Sweden were highest with 100% take-up. Ireland was lowest with just 84% take-up. However, where it was estimated that 11% of Australian households with one fixed telephone line also had in place more than one phone line, the figure for South Korea was 1%. This was the lowest penetration among all 14 comparator countries.

There were 52% of Australian households connected to the internet. For South Korea the figure was 56%. The highest recordings were for Hong Kong and Sweden (at 58%); the lowest recordings were for France (at 22%).

In addition, where 64% of Australians individuals over the age of 16 years were estimated to have a mobile telephone, for South Korea it was slightly higher at 66%. Hong Kong was ranked highest with 75% of this group having a mobile telephone.

Speed of internet connection was much higher for South Korea than Australia. Where just 5% of Australians using the internet at home had high speed applications (local area networks, cable, digital subscriber line), the figure for South Korea was 87%. In this South Korea ranked first among comparator countries.

Internet usage

Australia and Korea are among the countries with the highest internet penetration in the world. This has also been documented in a study comparing levels of internet penetration across 37 countries[6] (Taylor,

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[6] Countries in the study included Denmark, United State of America, Netherlands, Canada, Finland, Norway, Australia, Singapore, Korea, Hong

Nelson & Sofres Interactive 2002). Australia and South Korea were classified within the *high penetration* group, with over 40% of their populations having used the internet in the month prior to data collection. Other countries in this *high penetration* group included Belgium, Canada, Denmark, Finland, Germany, Hong Kong, Ireland, Israel, Netherlands, Norway, Singapore, Taiwan, and United States of America.[7]

In 2000 this study found there were 45% of Australians who reported using the internet in the month prior to data collection. This was substantially greater than that reported by their Korean peers. However, both Australia and Korea reported figures that were higher than the comparator country average. By 2001 Korea had increased its level of usage by 50% and slightly outperformed Australia, with both countries displaying levels that were considerably higher than the average for the comparator countries. By 2002 both countries demonstrated similar levels of usage, with Australia increasing its usage by five percentage points and Korea increasing its usage by one percentage point. They continued to demonstrate higher levels of usage than the average for their comparators.

The National Office for the Information Economy (2002) benchmarking study also ranked South Korea first in terms of the average number of internet sessions being undertaken at home. Where Australians averaged just 13 internet session in the month of July 2001, and spent an average of six hours and 55 minutes online, the average for South Korea was 26 sessions and 19 hours and two minutes respectively.

Table 1 indicates the percentage of the population indicating use of the internet in 2000, 2001 and 2002.

Kong, Taiwan, Ireland, Belgium, Israel, Germany, Estonia, Italy, Great Britain, France, Spain, Czech Republic, Slovak Republic, Malaysia, Turkey, Thailand, Poland, Mexico, Lithuania, Latvia, Serbia, India, Argentina, Romania, Hungary, Bulgaria, Indonesia, Ukraine.

[7] This above list is placed in order of the percentage of the population which had used the internet during the month prior to data collection. Scores ranged from 63% for Denmark to 4% for the Ukraine.

Table 1: Percentage of population using the internet 2000, 2001, 2002

	Australia	Korea	Comparator country average
Use of internet in month prior to 2000 data collection	45	34	32
Use of internet in month prior to 2001 data collection	48	51	31
Internet usage in month prior to 2002 data collection	53	52	34

Source: Taylor, Nelson & Sofres Interactive (2002)

The Australian Bureau of Statistics (ABS 2003) reports that, by the end of the March quarter 2003, there were 5.1 million inter-net subscribers nationwide, with 4.1 million (87%) of these being household subscribers, and 659 000 being government subscribers. In the second quarter of that year there were 55% of households with internet access and increase of 50% over 2001 figures. In addition there were 58% of Australians who had immediate internet access. This included 59% of those aged 14 years who had access at home, at work or other location.

Among Australian businesses, computer usage has risen from 49% of businesses in 1993–94 to 84% of businesses as of June 2001. In addition, the percentage of businesses with internet access has risen from 29% in 1997–98 to 69% in 2000–2001 (ABS 2002).

During June 2003, the National Office for the Information Economy (2003) also reported that in June 2002 just over 70% of businesses employing workers were online, while it increased to 80% of those with five or more employees, and 90% of businesses with 20 or more employees.

Gender differences

The Taylor, Nelson and Sofres Interactive (2002) study also confirmed that males continue to be greater users of the internet than females both in Australia and Korea. Both countries display similar gender splits and both outperform the average in comparator countries for males and females. This means that in terms of access both countries are not discriminating in any major way against females. Table 2 presents information on male and female users of the internet in both countries.

Table 2: Internet usage of males and females (%)

	Australia	South Korea	Comparator country average
Male users	56	56	38
Female users	50	49	30

Source: Taylor, Nelson & Sofres Interactive (2002)

Age differences

Those in younger age groups also display greater internet usage than those in older age groups in both Korea and Australia. There were 86% of Australians who were less than 20 years of age in 2002 who used the internet. This was considerably greater than the average of 60% for comparator countries. No corresponding figures for this group were available for Korea. However, Koreans in the 20–29 years age group had higher internet usage levels than Australians in the same age group. Nevertheless, Australians demonstrated higher usage levels than Koreans in the other age groups. Once again both countries outperformed the average for the comparator countries. These details are reported in table 3.

Table 3: Internet usage of specific age group, 2002 (%)

	Australia	**Korea**	**Comparator country average**
Less than 20 years	86	Not available	60
20–29 years	67	76	49
30–39 years	61	58	39
40–59 years	53	33	29
60 years or over	21	16	9

Source: Taylor, Nelson & Sofres Interactive (2002)

As table 3 shows, there are still divisions between those who have access to the internet and those who do not. Furthermore, extra information from the National Office for the Information Economy (2003) also confirms that internet participation for Australians decreases with age, and increases with educational attainment and income. There are also differences between those who live in metropolitan and non-metropolitan areas.

For example, internet usage was greater for those earning incomes between $40 000 and $49 999 than those earning between $10 000 and $14 999 (72% versus 36% respectively). Moreover, there were 90% of those whose incomes were more than $119 999 who had used the internet. There was also a greater proportion of those living in the metropolitan area (62%) than those in non-metropolitan areas (53%) who had accessed the internet. Nevertheless, non-metropolitan users had demonstrated greater proportional increases since June 2001.

Information on the reasons for households not having access to the internet have also been collected by the Australian Bureau of Statistics (2002). The major reasons are high costs of access (26%), lack of interest (25%), no use for internet access (16%), and access to internet not required because access was available at work or school or other location (7%).

Place of internet use

The home is the most common place of internet access for Australians and South Koreans, with South Koreans being slightly more likely to indicate this to be so than Australians. In this, both countries outperform the average for comparator countries. Australians are almost much more likely to use the internet at their place of work and at school and university than are South Koreans. Where Australia outperforms the average of comparator countries, South Korea mirrors this average. South Koreans are also more likely to use the internet in places outside home, work, and school or universities than are Australians. Their level of mobile internet usage is also greater than that for Australians and for the average of comparator countries. Table 4 provides a breakdown of this information.

Table 4: Place of internet use of total adult population (%)

Access	Australia	Korea	Country average
At home	42	44	24
At work	23	14	13
At school/university	8	5	5
Elsewhere	7	11	6
Mobile	2	3	1

Source: Taylor, Nelson & Sofres Interactive (2002)

Use of online government services

The use of online government services is higher for Australia than South Korea. A study conducted in by Mellor, Parr and Hood (2001), found that Australians were almost twice as likely to use the internet for government online services than were their South Korean counterparts. Where Australia outperformed the comparator country average for online usage of government services, South Korea lagged behind it (uptake was 31% for Australia, 17% for South Korea and 26% for the average of comparator countries).

The National Office for the Information Economy study (2001) also looked at the penetration of online government services. Here Australia was ranked in third place (behind Norway) with 25% of Australians using the internet at home having accessed online government services. The corresponding figure for South Korea was 13%.

Access to and use of ICTs by students

The first Programme for International Student Assessment (PISA) survey of 32 countries (all but two of which belong to the OECD) was conducted in 2000. Findings can be used to compare access to and use of computers, the internet and other forms of telecommunications of 15-year-olds in Australia and South Korea. It can also be used to benchmark scores on reading, mathematics and science assessments for 15 year olds (OECD 2000b).

The findings from the survey showed that almost 67% of Australian students and 62% of South Korean students had a link to the internet at home. Nevertheless, there is still a sizable proportion of students in both countries (9% for Australia, 14% for South Korea) who did not have a computer at home. The OECD average for having no computer in the home was 25%. About 39% of Australian students used their computer at school several times a week compared with 43% for South Korean students. The OECD average for the same frequency of use was 26%. However, Australian students were far less likely to say they never or hardly ever used a computer at school compared with their South Korean counterparts (8% versus 30% respectively). The OECD average for never or hardly ever using a computer at school was 24%.

In addition, just 15% of Australian respondents compared with 42% of South Korean respondents, reported that they hardly ever used the internet at school. However, there were about the same proportion of students from both countries who indicated that they used the internet at school several times a week (29% for Australia, 31% for Korea). The OECD average was 16%. There was also a similar proportion of respondents from both countries who did never or hardly ever read emails and websites (18% for Australia, 17% for South Korea).

South Korean students are far more likely to have access to cellular phones than Australian students. Where 13% of Australian youngsters had no cellular phone in the home, just 7% of South Korean students reported no cellular phone at home. Where almost 73% of South Koreans were in homes that had two or more phones, this was the case for just 57% of Australian students. The proportion of respondents without a television at home also was minimal for both countries (0.7 for Australia, 0.4 for South Korea).

Literacy and numeracy and access to the internet

The average PISA reading score for both Australian students and South Korean students with an internet link at home was greater than that for those without a home link to the internet (544 versus 499 for Australian students, and 533 versus 513 for South Korean students). The average score for the OECD was 525 versus 482. In Australia and South Korea, the average mathematics scores for students with an internet link at home was also greater than it was for those with no home internet link (548 versus 507 for Australia, 559 versus 529 for South Korea). The OECD average was 518.

The National Office for the Information Economy (2003) presents data to show that in Australia internet participation is also related to educational attainment. Between June 2001 and 2002 internet usage increased for all groups regardless of educational attainment. However, 85% of those with university degrees used the internet compared with 64% of certificate holders, 61% of upper-secondary school completers, and 40% of those with primarily an elementary school background.

Uptake of e-learning in education and training

When online activities are broken down by activities and location of access, there were 19% of the 6.8 million Australians living in metropolitan areas, and 17% of the 2.8 million Australians in non-

metropolitan areas who had used the internet to access education services (National Office for the Information Economy 2003).

However, the uptake of e-learning methodologies as the sole method of learning was low. The findings of the ABS Survey of Education and Training (ABS 2001) show that just 1.4 % of those who had undertaken a training course indicated that the main training method used in the course was computer disk or CDROM or internet or email. Another 1.8% indicated that the main method was audio or video cassette, or tele- or video-conferencing.

Training courses can also be broken down according to external and internal providers and main delivery methods used. When this is done, then 60.3% of respondents who had undertaken a training course indicated that courses delivered by internal providers were delivered mainly via computer disk, CDROM or internet or email. In addition, just 7.2% of those who had attended courses delivered externally by TAFE or technical colleges, and 0.5% of those who had attended a course delivered by a university or other tertiary institution, indicated that this was the case for them. This suggests that internal courses (that is, in-house training) provided by enterprises are far more likely to have higher proportions of e-learning activities than other courses delivered outside the company.

The National Centre for Vocational Education Research (NCVER) conducts a survey of graduates from publicly funded VET courses. Findings from the 2003 survey (NCVER 2003 unpublished data) indicate that 91.1% of respondents reported that their course was delivered in face-to-face formats (that is, personal classroom communication with teacher). This means that there were 8.9% of students who were not involved in courses that included personal face-to-face interaction with teachers. However, respondents also reported that their courses had been delivered via a variety of methods (that is, using blended methodologies). These included printed materials (66.0%), web-based resources (18.8%), videotape, CD or DVD (32.4%), online communication with teacher and other students (6.2%), radio (1.2%), television (6.8%), video conference (3.4%), tele-conference (.7%), workshop practical activities (42.2%), and other miscellaneous modes (7.4%). Rattray, Moran and Schueler (2001)

attempted to quantify the extent to which online learning was being utilised in the Australian VET sector. They came to the conclusion that it was difficult to quantify because teachers and trainers tended to use a range of methodologies in their delivery. There were few purely online courses.

Similar results are also evident in the uptake of e-learning in American universities. Between 1999 and 2000 there were 8% of all undergraduate, and 10% of graduate and first professional students who reported undertaking a distance education course delivered via e-learning methodologies from an American two-year or four-year college (National Centre for Education Statistics 2002). Among undergraduates, those who had family and work responsibilities, were female, attended a public two-year college and were enrolled in associate degrees were more likely to have participated in this form of learning. In addition, greater proportions of undergraduates majoring in education than in other fields participated in this type of learning. Apart from the gender effect this pattern was repeated for graduate students. For both groups the internet was the most frequent medium for delivery.

Tesone, Alexais and Platt (2003) note that it is traditional adult learners at both graduate and undergraduate levels (not those in the 18–20 year cohort) who are more likely to undertake these online programs.

In the following section we further examine the uptake of Information and Communication Technology in Korea.

III. Uptake of ICT

Growth of e-learning infrastructure in Korea

While having a good infrastructure is not a complete condition for development of e-learning, it certainly provides an important basis for such development. Having the right hardware and software infrastructure for e-learning to take place is crucial for the development of e-learning in a country. In the previous chapter, we have examined the efforts of the governments of Australia and Korea to develop a solid infrastructure for their countries. In particular, the initiatives of the Korean Government to build an information society in such a short period has attracted world-wide attention. In this chapter, we review the results of such efforts which are reflected in major improvements of key ICT statistics about Korea.

For e-learning to take place requires a set of preconditions. First, people should have access to computers or the internet. The number of people who have access to computers or internet largely determines the number of people who can utilise e-learning given that e-learning is provided. While access to computer or internet is important, it is also important that people can use computer and internet, which is often called ICT literacy. Dissemination of computers and internet, and usage of internet constitute important infrastructure for e-learning.

Rapid growth in access to the internet

In 2002, there were almost 26.5 million (26,480,000) personal computers (PCs) owned by individuals in Korea. Given the size of the Korean population, this indicates that 56% of the total population in Korea has a PC. As shown in table 5, this can be compared with the situation in 1995, where the number was about 5.346 million. This indicates that the

number of individuals owning a PC has quadrupled in only seven years. The rapid increase in the number of PCs owned by individuals indicates the rapid expansion in e-learning infrastructure and the rapid growth of ICT in Korea (see table 5).

Table 5: Growth in the number of PCs in Korea, 1995–2002

Year	Number of PCs(in 1000's)	Rate of diffusion(%)
1995	5,349	11.63
1996	6,304	13.71
1997	6,931	15.07
1998	8,269	17.98
1999	11,530	25.07
2000	18,615	40.48
2001	22,495	48.92
2002	26,480	56.00

Source: itx.or.kr, http://www.itx.or.kr viewed on May, 2004

The high degree of diffusion of ICT in Korea is also witnessed by the number of people who have a subscription to a digital subscriber line (DSL), which is the major means of access to the internet (see table 6). This figure has reached over 11.6 million in 2004. This indicates that almost 80% of the total households in Korea have direct access to the internet. In the year 2000, the number of those who subscribed to DSL was 3.87 million, indicating that about only one-quarter of the total number of households had access to internet in 2000.

Table 6: Growth in the number of digital subscriber lines (DSL) subscribers, 2000–2004

Year & month	Number (in person)	Rate of diffusion (%)
2004. 6	11 617 825	79.09
2004. 3	11 427 998	77.79
2004. 1	11 257 060	76.63
2003. 12	11 178 499	76.10
2002. 12	10 405 486	70.83
2001. 12	7 805 515	53.13
2000. 12	3 870 293	26.35

Source: itx.or.kr, http://www.itx.or.kr viewed in May, 2004

Altogether, the speed of growth in the number of people who have PCs or access to internet in Korea is worthy of attention. This period of rapid expansion of ICT infrastructure also helps to explain the rapid development in e-learning in Korea during the same period.

Growth in internet usage and group differences

The number of PCs and the rate of subscription to DSL only indicates the capacity of the population to access the internet. The actual usage of internet could be a better indicator of e-learning capacity.

Internet usage in Korea nowadays is very high. In December 2001, it is reported that 24 million people used the internet, thereby recording the rate of internet use of 56%. Here, 'internet users' are defined as those aged seven years and older who use internet at least once a month. This is a quite broad definition of internet usage.

Along with the rapid growth in internet usage, one thing to note is that there exists a wide gap in internet usage among different groups in Korea. There exists a wide gap between different groups in terms of age, gender, and educational attainment.

Age and gender differences

Internet use is highest at the youngest age group, that is for those aged seven to 19 years, and decreases with age (see table7). Only 8% of those age 50 years and over use the internet, while over 90% of teenagers use the internet. It is also worth noting that internet use has been increasing over time for all age groups.

Table 7: Internet usage by age group (%)

	1999. 10	2000. 12	2001. 12
Aged 7–19	33.6	74.1	93.3
Aged 20–29	41.9	84.6	84
Aged 30–39	18.5	61.6	61.3
Aged 40–49	12.8	35.6	36.6
Aged 50 and over	2.9	87	8.3

Source: Internet Whitepaper (2002)

There is also a gender gap in internet use (see table 8). In December 2001, it is estimated that while 55.6% of men are using the internet, 44.4% of women are doing so. This indicates a gap of over 10% points between men and women; however, there is also a tendency for this gap to decrease over time.

Table 8: Trends in internet usage by gender (%)

	Male	Female
2000.3	62.6	37.4
2000.8	57.7	42.3
2001.1	56.8	43.2
2001.3	57.1	42.9
2001.6	56.8	43.2
2001.9	56.1	43.9
2001.12	55.6	44.4

Source: http://www.itx.or.kr viewed in May, 2004

Differences by educational attainment

Internet use also varies with the educational attainment of an individual. In the adult population, internet usage of those with university education is very high, reaching over 80% in 2001 (see table 9).

Table 9: Internet usage by educational attainment (adult population) (%)

	Middle school graduates or lower	High school graduates	College graduates and higher
2001. 12	4.3	41.2	81
2001. 6	3.4	37.5	74.3
2000. 12	2.8	27.8	67.5
2000. 8	1.9	23	59.4
2000. 3	1.0	16.2	52.2
1999. 1	0.5	9.3	37.1

Source: Internet Whitepaper (2002)

If we look at the differences between different student groups in terms of their school level, internet use also increases with the school level, while the gap between groups decreases over time (see table10). The decreasing gap between different student groups at different school levels also shows how quickly internet use is spreading among students in Korea.

Table 10: Internet usage of students by education level (%)

	Elementary school	Middle school	High school	College
2001. 12	88.4	99.8	99	99.3
2001. 6	75.8	96.6	962	98
2000. 12	51.8	89.3	91	96.2
2000. 8	41.4	80.9	82.6	95
2000. 3	22.8	65.8	82.9	92.2
1999. 10	13.2	48.7	57.1	82.1

Source: Internet Whitepaper (2002)

IV. Overview of e-learning

Findings from existing research in Australia and overseas

A major area of educational research has tried to investigate the uptake of e-learning and the extent to which it has affected the work of teachers and the learning of students. There have also been attempts to evaluate its effectiveness. In this section we report on some findings from existing research.

Introducing online learning to teachers and students

The first challenge in any e-learning delivery system is to get teachers interested in engaging with this form of learning so that they adopt this in their own delivery strategies. Many training organisations have attempted to do this with varying degrees of success. The implementation of online delivery in tourism and hospitality teaching areas (William Angliss Institute of TAFE 2002) found that, although there continue to be challenges to engage experienced teachers who value face-to-face training with online delivery, there have been some successes.

Institutions have also found innovative way to increase teacher comfort and skill with online applications by embedding e-learning into normal routine and social activities (South West Institute of TAFE 2002). For example, the staff of the Flexible Learning Unit at the South West Institute of TAFE in the state of Victoria, introduced a virtual car rally to 'increase confidence and usage of information and communications technologies amongst [institute] staff'. The virtual car rally was found to

reinforce teacher awareness of how ICT tools could be used in the classroom (for example online quizzes, bulletin boards, email, and web browsing).

Institutions have adopted a variety of ways to entice students to adopt e-learning options. For example, the Business Online team in one Australian VET institution (Northern Melbourne Institute of TAFE 2002) was given the task of implementing the eBusiness subjects. The task was to ensure that students were able to 'get online and stay online'. In developing a marketing plan for their subjects, the team used a list of online learning target groups developed by Farrell (2002), and divided according to their characteristics and motivations to engage e-learning. This can help to improve our understanding of why certain students take up e-learning and the identification of their special needs.[8]

Skilling and supporting online teachers

Teachers who are going to be involved in online delivery require training to develop their expertise in using technology and developing effective course materials. They need to acquire or understand the principles of effective layout so that they will be able to provide students with web pages and other resources that are attractive and easy to navigate. Resource materials must also be easy to understand. This means that teachers must be able to write in plain and concise English. In the absence of any immediate face-to-face or virtual contact teachers must also be able to interpret and facilitate the activity of students involved in electronic discussions and other inter-net activities. Students and teachers will have to learn how to write their comments so as to avoid

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[8] The groups identified by Farrell include the time poor, the home bound, the geographically isolated, the technology advocate, the skills developer, information requirer, career achievers, and re-skillers. Farrell has also made informal predictions about possible course completions. These predicted completion rates were best for the time poor who have high motivation to get ahead, the geographically isolated, skills developers (including trainers and educators), and career achievers (see appendix C).

misinterpretation. Palmieri and Cashion (2002) also encourage teachers to be selective about the features they incorporate into their files. This is because increased complexity leads to longer downloading times.

In addition to general pedagogical skills and skills in instructional design, online teachers must have access to technical design skills, support and other resources (Palmieri & Cashion 2002; Box Hill Institute of TAFE 2002)). Such resources and support are essential to the implementation of effective online learning. In addition, training providers need also to develop effective online administrative processes to enable students to make online enrolments and online payments for courses and to capture information on enrolments, demographics and assessment results. With increased internet usage, additional technical support staff will be required to alter systems to cope with increases. This is especially the case for institutions with more than one campus. However, in order to maintain the flexibility of delivery, the maintenance of the network should be scheduled so as not to penalise students who may only be able to access materials on weekends.

In addition, there needs to be substantial commitment and support from the organisation and its support service departments and individual staff. Furthermore, there also needs to be facilities and equipment to enable students to access the internet, sound files and video clips.

Changing patterns of teacher work

E-learning requires changes to the work patterns of teachers. According to Choy, McNickle and Clayton (2002), there is a major need for teachers to understand the various capacities, resources and expectations of students who decide to undertake online learning programs. Because of the one-to-one interaction or feedback required in online teaching, the work of such teachers has changed dramatically (Palmieri & Cashion 2002; Brennan 2003; Kilpatrick & Bound 2004). Often isolated from other teachers, spending more time at computers monitoring and responding to feedback from students, and having to provide feedback to students at all hours, teachers in these programs believe that their work activities are not well understood by their colleagues and superiors.

Brennan (2003) reports that online methodologies introduce a variety of increased demands on teacher work and out-of-work time which have also contributed to their sense of loss of autonomy. These studies have been conducted in VET institutions in Australia. An article in the *Chronicle of Higher Education* (2002) indicates that university teachers in the USA face similar issues.

Because online students are generally not regularly on campus and therefore are not a visible group, teachers are of the opinion that there is inadequate understanding by managers of the additional resources and substantial support that such students require (Kilpatrick & Bound 2003; Brennan 2003). Keeping this in mind, Palmieri and Cashion (2002) raise questions about the appropriateness of using face-to-face contact hours as performance indicators for providers (Palmieri & Cashion 2002).

Helping teachers to manage e-learning processes

The social sciences department of the East Gippsland Institute of TAFE (2002) has developed an individual learner management system (EdTrak) to deal with such issues (see appendix C). In implementing the system in-house, the social sciences department found that it had provided professional development opportunities for teachers and learner managers. However, staff who had little prior experience needed to develop skills in a short amount of time. The provision of external online and telephone access to EdTraK now makes it possible for the department to create a learning plan online while speaking to employers. However, Microsoft Access was found to be unsuitable and another tool (postgreSQL) has been far more useful in creating the database. There continue to be issues with speed of access now that the program is available online rather than as a stand-alone database.

Selecting online learning methods by students

Students select online learning methods because of their convenience and flexibility. A study of university students in a macroeconomics course by Navarro and Shoemaker (2000) found that students mainly chose this form of learning for convenience and because they wanted to learn at their own pace. Students undertaking the same course via traditional face-to-face methods had not chosen the online course because they felt more comfortable in a traditional classroom, and did not believe that they would learn as much from the online course. Tesone, Alexakis and Platt (2003) also note that students choose online learning programs because they can choose when and where they do the training; that is, flexibility of time and convenience of location. In addition, there are also international students seeking courses from American universities, and out-of-state students who want to continue to access courses from home during summer terms.

In the main, VET students who undertake online programs also enjoy the flexibility that is possible via this form of study (Kilpatrick & Bound 2004; Palmieri & Cashion 2002; Brennan 2003). This is because they want to have more control over where, when and how they study. However, when Brennan and Palmieri and Cashion asked students which learning methodology they preferred, both studies found that students preferred face-to-face teaching. Maki and Maki (2002) have also confirmed that university students prefer face-to-face formats in comparison with online formats.

Palmieri and Cashion (2002), and Kilpatrick and Bound (2004) also indicate that online learning enables students with access to the required hardware and software to interact with new and advanced technologies to customise their training to suit work and life commitments. It also provides access to learning for students from remote and rural areas and can be used by companies to provide 'just-in-time' training, and up-to-date information.

Preparing students for online learning

It is also clear that any online learning program requires students to be motivated, self-directed and well-organised if they are to complete their assignments (Brennan 2003). In addition to being sufficiently motivated to manage their learning time, online students must have adequate reading, comprehension and writing skills as well as a facility with technology. This is because much of the learning involved is based on the ability of students to read instructions and materials and complete assignments in written form. A study of students in an introductory psychology course (Maki & Maki 2002) found that student performance on a comprehension skills test (the multimedia comprehension battery) predicted differences between web-based and lecture courses, with higher skilled students benefiting the most from web-based courses.

Assessing students in online learning programs

An online survey of online learning practitioners conducted on behalf of the Flexible Learning Framework (Strategic Market Intelligence 2003) found that assignments were the most prevalent form of assessment used 'usually or always' by over half of the 158 respondents[9] to the survey. Tests followed by simulations were the next most frequently used assessment options. Over 75% of respondents used quizzes, email and online submissions. However, group performance assessment, or peer-assessment was not widely used.

Well over two-thirds 'agreed or strongly agreed' that the biggest issue they encountered was the time and effort required to meet 'accessibility

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[9] Respondents included teachers, facilitators and trainers, content writers and learning designers, managers, project managers, online project managers, programmers and developers, graphic designers, IT support and other support personnel, assessors and others involved in e-learning provision.

standards'. Another issue was security and the verification of learners, and the amount of time required to undertake online assessments.

Respondents believed that online assessment techniques enabled 'ongoing continuous assessment' and helped 'meet reporting requirements'.

Measuring the effectiveness of online learning

A number of measures have been used to evaluate the effectiveness of online learning, including student performance on tests, levels of satisfaction, and retention. However, evidence is mixed as to whether there are statistically significant differences between online methodologies and more traditional methods. However, researchers have claimed that findings of no statistically significant differences between the two methods, mean that each can produce required learning.

Neuhauser (2002) investigated the effectiveness of online learning by examining class differences in test scores, assignments, participation grades and final grades. She found no statistically significant differences between students who were undertaking a course online and in asynchronous time, and students undertaking the same course in a face-to-face situation. Neuhauser also found that student learning preferences had no impact on final grades for both groups, and that retention rates were identical. Neuhauser concluded that similar learning activities in online or traditional formats can be as effective as each other. Aragon, Johnson and Shaik (2002) also examined how learning style preferences impacted on student success in online and traditional environments. They concluded that learners could be 'just as successful' in both types of environments, regardless of learning style differences.

That both methodologies were equally effective was found by Johnson (2002), who investigated differences between online students and on campus students in a biology course. Carlisle reported no statistically significant differences between the two groups in their understanding of

biology subject matter, skills in graphing, reasoning, and positive attitude to the subject of biology.

When Rynearson, Kerr and Kerr (2004) compared the achievement of students undertaking chemistry labs either in the traditional format, or in an online format, they also found no statistically significant differences on pre-tests, post-tests, and gain scores. In addition, no statistically significant differences were found between the two groups when they were provided with instruction using the traditional expository method of teaching.

Navarro and Shoemaker (2000) compared the performance of a group of students undertaking an online introductory course in macroeconomics, with that of students doing the same course in a traditional format. They found that the online students performed slightly better than the traditional students on a final exam. The researchers also found that, although the great majority of online learners were satisfied with the amount of teacher student interaction, well under half of online learners were satisfied with the amount of interaction with other students that was possible with this form of learning. Both groups reported high levels of satisfaction with the methodology they had chosen. VET students in the Brennan (2003) study also desired more interaction with other students.

A study by Hodge, Tucker, and Williams (2004) investigated student perceptions of online, traditional and blended delivery methods. It found that those students who had access to online course materials and classroom instruction (that is, blended delivery) were more motivated by the instructor than those who received only one form of delivery. Students also preferred traditional face-to-face methodologies for practical technology courses.

Brown and Liedholm (2000) used scores on a final examination to analyse the performance of university students (studying principles of macroeconomics) in three different modes of instruction: live, hybrid and virtual. The different modes each used the same textbook, multiple choice examinations and email and course websites for communication. The live course used traditional instructor-led face-to-face methodologies. The hybrid course used this methodology and supplemented it with online

materials. The virtual course was delivered online. They found that the virtual (online) methodology was associated with poorer performance. This was especially the case for more complex subject matter. However, the students in the live class also spent more time and effort in the course, and this could have contributed to their superior performance.

Tucker (1999) compared preferred learning styles, age homework grades, research paper grades, final exam scores, final course grades and pre-test and post-tests of subject matter knowledge. Statistically significant differences at the .05 level were found for post-test scores and final exam scores, with online students achieving higher scores on all. However, no such differences were found for pre-test scores, homework grades, research paper grades and final course grades.

Students, and especially older learners, were found to increase their self-confidence from engagement in online programs (Kilpatrick & Bound 2004). When respondents to the NCVER student outcomes survey were asked to evaluate the most satisfying delivery mode used in their program, 57.7% preferred face-to-face delivery, 22.5% workshop practical activities, 9.5% a mixture of modes, and 6.2% printed materials. Satisfaction levels for all electronic modes (web-based resources, videotape, CD or DVD, online communication, radio, television, video-conference, tele-conference) were low and ranged from 0.1 to 1%. Just 0.6% of respondents replied that online communication was their most satisfying delivery mode.

Concerns and limitations of e-learning

Although online methodologies open up access to training because of their electronic reach, they may also present access issues for those students who may not be able to afford the cost of computer hardware, internet access and appropriate software. Access difficulties may also be experienced by students living in regional areas where the telecommunications infrastructure is inadequate, and where the information technology bandwidth makes the downloading of information slow and difficult (Palmieri & Cashion 2002; Kilpatrick &

Bound 2004). Access difficulties will be experienced especially by rural Indigenous and low-income students and students with disabilities.

Difficulties for students with vision difficulties

A trial conducted by the Royal Victorian Institute for the Blind (2002) investigated the issues faced by people who are blind and vision-impaired in accessing online vocational education and training for the information technology industry (see appendix C for detailed description). The online program enables students to acquire workplace competencies for the information technology industry by completing a variety of realistic practical tasks and assignments in a simulated information technology company. The findings showed that the difficulties experienced by blind or vision-impaired students were similar, but more pronounced, to those experienced by their sighted counterparts. For example, students with limited motivation, narrow internet bandwidth, and limited prior understanding of flexible learning were more likely to withdraw from the course. The findings also showed that such students required access to substantial support from facilitators early on in the course, and that the availability of an information technology help desk was essential and especially helpful to learners who were new to computers and to operating their adaptive technology.

Limited literacy and ability for independent learning

Furthermore, online learning may also pose difficulties for students who do not have high literacy or comprehension levels (Maki & Maki 2002) or have the self-discipline and motivation required to undertake programs which are generally self-paced (Brennan 2003). Keeping in mind that they will be doing a lot of the learning on their own without other students in easy reach to help them, or teachers immediately available to provide help, they will need to be resourceful in navigating online course materials, and being able to follow instructions.

E-learning is here to stay

Regardless of whether online learning does or does not provide better outcomes than traditional learning, it is here to stay. It provides an alternative route to qualifications for those who are unable to attend regular classrooms. It also enhances traditional delivery in programs that blend new technologies with traditional face-to-face teaching. The challenge is to make sure that each of the delivery methods makes good use of ICTs to improve effectiveness, and that a sensible blending of the two technologies occurs as subject matter becomes more complex. However, it is clear that online teaching requires both teachers and students to be adequately skilled to engage in the methodology, and that institutions must recognise the different patterns of working for teachers.

In the following section we focus on the implementation of e-learning in Korea.

IV. Overview of e-learning

E-learning in Korea: an overview

Governmental promotion of e-learning through numerous policies has played an important role in developing e-learning in diverse sectors, such as schools, universities, private companies, and the public sector. This section reviews how e-learning is implemented in diverse sectors along with more details of e-learning in action in each sector. In particular, this section attempts to explain the e-learning situation in Korea for each target group at different education levels and in different sectors. It also introduces specific features of Korean e-learning, such as online universities and e-learning for government employees.

Primary, secondary, and higher education, online university and college, corporate training, government employee training, and general public education are the primary areas where e-learning is expanding in Korea. However, these various institutions show some differences in their missions and goals, due primarily to the differences in the target learners for each institute. Moreover, the extent of proliferation and promotion of e-learning in schools differs according to the state department that is responsible for its implementation.

E-learning at primary and secondary education

In the area of primary and secondary education, e-learning has been taking root and expanding through projects led by the Korea Education and Research Information Service (KERIS). The Korea Education and

Research Information Service was founded in 1999 with the mission of raising the quality of education and research through the establishment and operation of a nationwide knowledge and information service system. As part of its mission, KERIS has been operating EDUNET, an e-learning portal site, servicing elementary, middle, and high school teachers, students, and parents since 1996. It is also a major institute for policy studies related to distance learning for higher education and lifelong learning.

The materials developed by KERIS in 2002 are learning materials that can be used online by both instructor and learner. These have been developed by various projects including the instructional content development project, the learning content development project, and the content utilisation support project (Jeong, Seong-mu et al. 2002.). Table 11provides a comprehensive description of the various content development projects for the year of 2002.

Table 11: Content development projects for the year 2002

Categories	Project titles
Instructional content development project	1. Multimedia-based educational materials development
	2. Instructional software for special education development
	3. ICT-based lesson plans development support
	4. Instructional software development support
	5. Domestic/international website DB development
	6. National educational software contest
	7. Multimedia resources contest
Learning content development project	8. Individual learning contents development
A content utilisation support project	9. Content utilisation cases contest
	10. Quality accreditation system operation
	11. Original software diffusion

The number of studies on primary and secondary e-learning education systems as well as instruction and learning models appropriate to e-learning has been growing recently, for example, the EDUNET Pilot School Project operated by KERIS. Distance teacher professional

development centres have been established as an alternative to the face-to-face ones. As of December 2001, 39 distance centres for teachers have been operating, and this number is expected to grow steadily.

Nevertheless, e-learning in the regular primary and secondary schools curriculum, compared with lifelong education and higher education, is not as widespread. In fact, the private education sector in primary and secondary levels is likely to become one of the biggest e-learning markets. (Refer to table 12 for the main e-learning service companies currently operating at primary and secondary levels.) One study indicates that the projected proliferation of e-learning in the private education sector is accelerated by the educational system in which a student's academic evaluations are used solely for gaining admission to college (Kang Suk-hui et al. 2003). The private e-learning market for primary and secondary schools is comprised of businesses which provide only online learning, groups which operate online education, as well as publishing businesses (Ministry of Commerce, Industry and Energy 2003).

Table 12: Main private e-learning service providers for primary and secondary schools

Companies	Site names	URL	Main features
Chamnoori	1318class.com	<http:www.1318class.com>	Secondary, distance lectures
Baeoom.com	baeoom.com	<http://www.baeoom.com>	Learning portal (K–adults)
Chamgyo.com	Chamgyo.com	<http://chamgyo.com>	Learning portal (K–adults)
Em jungbogyoyookwon	cool2000	<http://www.cool2000.co.kr>	Learning portal (K–adults)
Iyagi	edumoa	<http://www.edumoa.com>	Elementary, all subjects
Daegyeo	edupia	<http://www.edupia.com>	Primary & secondary learning resources
Inet school	inet school	<http://www.inet-school.co.kr>	Primary & secondary, learning portal
Jnj gyoyook media	jnj gyoyook media	<http://www.jnjedu.net>	Secondary, distance lectures
Megastudy	megastudy	<http://www.megastudy.net>	Learning ability test, distance lectures
Woongjin.com	woongjin thinkbigi	<http://www.thinkbig.co.kr>	Thinkbig membership only
Tnara	Tnara	<http://www.tnara.net>	Elementary teacher/students
Wisecamp.com	wisecamp	<http://www.wisecamp.com>	Elementary, all subjects

E-learning in higher education

The government's pro-active approach has contributed to the introduction of e-learning into Korean colleges and universities, although the scale of this contribution may be small compared with that for the implementation of e-learning in primary and secondary education. In February 1998, the Ministry of Education and Human Resources Development selected five model institutes and ten pilot institutes to operate online universities, and the selected institutes were comprised of seven consortia and eight independent individual universities. As of August 1999, 68 traditional offline universities (13 individual and 55 in consortia) participated in this university project.

E-learning, which started among a few departments in a handful of universities in the mid-1990s, along with the pilot online university under the Ministry of Education project, opened 836 e-learning courses in the spring semester of 1999. The number of students enrolled at that time reached 56 000, and this number quadrupled in the spring semester of 2000 with 1000 courses and 200 000 students. It is astonishing that one out of eight four-year college students are registered for online courses. The pilot project sponsored by the Ministry of Education, which ended in 2000, was not implemented under any specific law or any financial or technical support. Instead, the ministry simply encouraged individual universities and organisations to participate in the pilot project voluntarily, analysing various emerging problems and researching alternatives to be used later in the policy decision-making process when online colleges were formally launched.

The results of this two-year (1998–2000) pilot project run by existing offline universities helped to provide the legal basis for establishing online universities under the *Lifelong Education Act* which became effective after March 2000. Moreover, the project catalysed the introduction and establishment of e-learning in government and other public institutes. These included the online graduate school program of the Ministry of Information and Communication, and the Cyber Environmental Education Centre of the Ministry of Environment in 1999,

and the Cyber Unification Education Centre of the Ministry of Unification, created in 2000.

However, the evaluations of the pilot project by the Ministry of Education shows that participating online universities had suffered financially and technologically. They also tended to be heavily concentrated in popular departments, such as information technology, design, and business management. These features anticipated the potential problems that online universities may undergo under the *Lifelong Education Act*.

In April 2001, the Korean University Alliance for Cyber Education (KUACE) was established for the advancement of e-learning in higher education. According to a KUACE study on the current state of e-learning, over 40% of Korean universities have implemented e-learning in one form or another. More specifically, of 376 Korean universities nationwide (including nine online universities), 151 universities have implemented e-learning either partially or entirely in their curriculum. Twenty of these are four-year national or public universities, six are elementary school teachers' colleges, and 75 are four-year private universities. There are also 31 two-year private colleges, and 19 other universities. The operational features of those universities and colleges are summarised in table 13 (Korean University Alliance for Cyber Education 2002).

Table 13: Features of universities' and colleges' e-learning operations

Features	National 4 years	Private 4 years	Private 2 years	Total
Independent operation of cyber campus or cyber graduate program	33.3	36.1	27.3	32.9
Consortium with other universities, course sharing	46.7	55.6	36.4	47.0
Consortium with both other universities & partnership with business sectors, course offering	0	2.8	4.5	2.7
Partnership with business sectors only	6.7	2.8	9	5.4
Individual faculty's undergraduate course offering, under the governance's support	73.3	83.3	77.3	79.5
Individual faculty's graduate courses offering, under the governance's support	40	19.4	0	17.6
Others	6.7	2.8	0	2.7

Moreover, the *Higher Education Act* has authorised the establishment of online special graduate schools, and as of January 2003, six universities are operating online graduate programs. Policy studies on e-learning in higher education began appearing since 2002.

Cyber universities-a special feature of Korea

The establishment of nine online universities in March 2000, under the *Lifelong Education Act* legislated in August 1999, signalled the beginning of the second generation of e-learning universities, and as of March 2003, there are a total of 16 online universities in operation (see table 14, Ministry of Commerce, Industry and Energy 2003). In the meantime, lifelong education institutes accredited by the *Lifelong Education Act* also became eligible to offer credit courses under the Credit Bank System. Established under the *Lifelong Education Act*, the

online university is a lifelong education facility as well as a higher education institute. Upon completing the courses defined by law and academic regulations, a student of an online university will be accredited with the same degree as a traditional college or university graduate. As of the second-half of the 2002 academic year, students enrolled in online universities are primarily in their twenties and thirties. In addition, the fact that 85.8% of the total students have jobs indicates that the majority of the students are workers seeking a degree or continuing education while working.

Table 14: 16 online universities' size: enrolment, programs and faculty

Names	Authorised enrolment size	Numbers of academic programs	Full-time academic faculty (after part-time lecturer included)
Kyunghee cyber university	1600	8 departments, 1 program	12 (48)
Dongsuh cyber university	400	2 departments	3 (11)
Cybergame university	700	2 programs	4 (9)
Saegil digital university	800	4 departments	3 (13)
Sejong cyber university	1300	3 programs	10 (38)
Hanyang cyber university	1000	5 departments	5 (22)
Saegyae cyber university	1300	3 programs	9 (45)
Saemin digital university	570	1 department, 2 programs	6 (28)
Youngin cyber university	400	4 departments	4 (28)
Kukjae digital university	500	5 departments	5
Yulin cyber university	1400	6 programs	7 (34)
Hankuk cyber university	1650	7 departments	13 (28)
Seoul digital university	1600	5 programs	12 (48)
Hankuk digital university	1800	12 departments	26 (80)
Seoul cyber university	1800	3 programs	19 (25)
Hansung digital university	500	5 departments	6 (22)

Since the online university is only at the start-up stage, more time, effort and legal support are needed for an e-learning culture to take root. Since online universities are authorised, operated, and supervised under the Enforcement Decree of the *Lifelong Education Act*, the lack of an accompanying set of operational regulations may also lead to future problems for their effective development. The criteria for establishing an online university (school buildings, education facilities, the recruitment of teachers etc.), as well as arrangements for managing academic affairs (the number of school days per semester, the academic year, the number of hours per credit unit etc.) continue to be based on factors inherited from the regulatory policy of the traditional offline classroom educational institutes. This is also a limiting factor.

Although not extensive, recent research studies have focussed on making improvements to management and curriculum in online universities. They have specifically concentrated on quality management, content design, and educational system establishment. At the macro-level, such studies have also examined guidelines for establishing online universities, and surveying current practices.

Corporate training

With a gradual upward trend in the number of the internet users, e-learning in the vocational sector is also growing. It is particularly visible among large corporations, where both in-house programs and outsourced programs supplied by e-learning companies operate side by side. Table 15 indicates the recent e-learning enrolment rates in the leading large corporations. In the main, corporate training divisions use blended learning approaches for training employees. They combine e-learning with traditional methods to maximise learning outcomes. In addition, they focus on designing a customised educational system that will contribute to the company's competitiveness, while meeting the needs and demands of individual learners (Ministry of Commerce, Industry and Energy 2003).

In the corporate sector, companies tend to form alliances to better represent their interests. In addition to the Korea Alliance of Cyber

Education, the Korea Federation of E-learning was founded in June 2003. The federation is primarily comprised of businesses specialising in e-learning, corporate training and education centres, and corporate departments in charge of e-learning. Its objective was to expand the base for e-learning and increase the competitiveness of e-learning-related businesses.

Currently, the Ministry of Labor provides policy and financial support for the enhancement of employees' vocational competency. In 1999, the Ministry of Labor added web-based training (known as internet-based training) to the *Vocational Training Promotion Act* as a new form of vocational training and education. The ministry has been subsidising part of the training expenses to the employers who, in compliance with the *Employment Insurance Act*, have their employees take web-based training courses. Moreover, in August 2001, the ministry announced a plan to promote internet-based training, and it is currently being enforced. The Korea Research Institute for Vocational Education and Training (KRIVET), through its centre for e-learning, advises the Ministry of Labor regarding internet communications training, and promotes research and related projects for vocational and lifelong education. In 1998, the internet-based Training Project was implemented in seven companies, with 67 courses and 7187 participants. In September 2000, there were 18 companies operating these training programs and a total of 206 courses offered (Yi Su-gyeong et al. 1999).

Table 15: Main large corporations' e-learning enrolments trends, 2002

Company	Registrants numbers	Company	Registrants numbers
KT Telecom	82 000	Samsungfire Insurance	20 000
Samsung Electronics	40 000	Samsung Life Insurance	20 000
SK Telecom	25 000	Kyobo Life Insurance	12 000
LG Electronics	20 000	Shinhan Bank	10 000
Posco	130 000	Hyundae Motors	15 000
Dongbu	10 000	Lotte Academy, Lotte Shopping	8 000
Daewoo Motor Sales Corp.	6 000	Kolon Industries Inc.	3 000
Doosan Heavy Industries & Construction	2 100	Korea life Insurance	3 000
Human Resources Development	2 000	LG Industrial Systems	1 600
Woongjin Coway	1 700	Daerim Industrial	1 500
sub total		412 900	

Source: Magazine of e-learning, December 2002

Through full utilisation of the Ministry of Labor's internet-based training, there have been positive results in terms of the educational cost-effectiveness of education. However, as a response to the criticisms that the criteria for reimbursement of employment insurance has produced uniform internet-based educational content (*Digital Times*, 10 July 2001) and that subsidies for training have been given mostly to large corporations (Ministry of Commerce, Industry and Energy 2003), the Ministry of Labor is directing its efforts towards quality management and to necessary revisions in the relevant laws and regulations.

Within the area of corporate e-learning, there is much discussion addressing current critical issues and future development. There is a

growing demand to expand blended learning to maximise teaching outcomes and to conduct more measurable and specific studies on the effects of e-learning. From 2003, research in such areas is expected to be in full swing, led primarily by e-learning companies and large corporations. Along with the concerns about inefficient information-sharing and resources due to a lack of consistent standards, there has also been a growing debate, since 2002, about the standardisation of e-learning, which will be the top priority for future expansion and marketability of e-learning. Similarly, high-quality customised content, improvements of the internet-based Training System, and the fostering of e-learning professionals have all been receiving much attention.

Training for other target groups

Training for government employees

E-learning for government employees is expanding with the establishment of the Central Officials Training Institute (COTI), subsidised by the Ministry of Government Administration, as well as with local officials training institutes. Twelve of the 37 training institutes operate e-learning courses, and most of them have been implementing e-learning courses as part of the traditional classroom curriculum. Under the leadership of the Central Officials Training Institute, the government's official training institutes, the Seoul City Officials Training Institute and the Incheon Metropolitan City Local Officials Training Institute, have organised the Council on the Cyber Training of Government Officials. The role of the council is to prevent overlapping and duplication of content development and to cut costs by sharing existing content. In addition to content sharing, these institutes are sharing a server system. Among the 16 institutes (including 4 self-governing bodies), 14 institutes are sharing the server system, while 12 of the institutes are sharing content (Ministry of Commerce, Industry and Energy 2003).

Because e-learning in government officials' training institutes is still at the start-up stage, hardly any research is currently in progress. However,

there are several issues under discussion related to the promotion of e-learning for government officials. First of all, a need to appoint an e-learning specialist to manage the project for e-learning has been noted. This demand for an e-learning specialist seems to arise from the lack of an e-learning specialist or expert in the majority of the training institutes. In cases where they do exist, they have been generally hired on short-term contracts which also makes it difficult for them to be involved in long-term planning and strategy building. Moreover, the need to support self-directed learning and to link the e-learning to the Knowledge Management System is also being acknowledged (Ministry of Commerce, Industry and Energy 2003). These concerns reflect an increasing awareness of the urgency of providing government employees with access to lifelong education and training to facilitate the establishment and operation of online government services.

E-learning for the general public

The e-learning opportunities for the general population are also steadily increasing. Among them, the following two cases are representative in illustrating the mission and trend in e-learning for the general public. Since September 2001, the Korean Agency for Digital Opportunity and Promotion (KADO), the agency in charge of bridging the digital divide, has been operating a website named 'estudy' (<http://www.estudy.or.kr>) to expand information literacy training for those least exposed to information literacy, while trying to reduce the information gap between different regions and social classes. Table 16 provides a listing of available e-study courses.

Table 16: E-study's current curriculum

Category	Courses	Hours	Maximum enrolment
Introductory application	Computer basics	15	600
	Internet basics	15	600
	PC self fix & utility	15	600
	Excel basics	15	600
	Hangul 97	15	600
	Homepage design	15	600
Intermediate	Powerpoint 2000	15	600
	Excel Intermediate	15	600
	Hangul 97 Intermediate	15	600
	Homepage designing upgrade	15	600
	ASP web programming basics	15	600
	Linux basics	15	600
	Photoshop 6.0	15	600
	Flash webdesign	15	600
Certificate courses	Internet Information Searching certificate 1 & 2	15	600
	Word processor certificate 1 & 2	15	600
	Computer Literacy 2/3	15	600
Different users customised courses	Homemakers' Internet	15	200
	Senior Citizen's Internet	15	200
	Visual Handicapped's Internet	15	200
	Hearing Handicapped's Internet	20	200
	Visual Handicapped's Application software and hardware	20	200

In its first year in 2001, the agency developed nine courses for basic information literacy training content and 13 additional courses, including intermediate courses as well as preparatory courses for certification in the second year. It currently operates 22 information literacy training courses, and the total number of recipients has reached 100 000. The demand is greater for intermediate courses than basic courses; the age group

between 30 and 40 make up a significant portion of the enrolment and the learners are comprised of office workers, homemakers, and students, in descending order of size. Beyond the Seoul metropolitan area and Gyeonggi-do province, training recipients are evenly distributed among different regions (Ministry of Commerce, Industry and Energy 2003).

In November 2001, the Agriculture Forestry Fisheries Information Service launched a distance learning website (<http://www.farmedu.net>) for farmers, and currently operates 11 courses. In 2002, there are a total of 24 courses, after adding 13 courses to teach farmers how to utilise agriculture software programs. In 2003, the training programs were restructured according to the information literacy education system for farmers, and based on the evaluation of the farmers' information literacy level. The ICT level checking service has been providing assistance in choosing the course that fits the individual learner's competency.

In the following section we report and comment on findings from case studies. These provide further support for the findings of research thus far considered.

V. Case studies

Australia

Design of case studies

To get an up-to-date picture of what is being applied to education and training in Australia, researchers visited vocational training colleges, universities and enterprise training institutions. They also acquired information from websites of the different institutions to get a closer understanding of the online facilities available to students, for enrolling or undertaking courses online.

It was decided to collect information from a small set of educational institutions and enterprise training organisations. All Australian TAFE colleges are committed to resource-based training which makes good use of advanced technology. Keeping this in mind, it was decided to collect information from the main distance learning institution for TAFE New South Wales (OTEN), and from TAFE institutes beginning to incorporate e-learning into training (TAFE SA Tea Tree Gully Campus). In addition, already existing case studies developed under the umbrella of the Flexible Learning Framework (a national framework devoted to the implementation of flexible approaches to vocational training) provided information on how teachers and students begin to engage with e-learning approaches.

Keeping in mind that Australian universities have always provided opportunities for students to study using distance learning methods (which in the past were predominantly print-based), it was decided to collect information from the University of South Australia which has a Flexible Learning Unit dedicated to the supporting the implementation of e-learning within courses. This university has also a commitment to having an online presence for all of its courses.

Information on the uptake of e-learning was also gained from the results of national statistical surveys of education and training conducted by the Australian Bureau of Statistics and national survey of student outcomes conducted by the National Centre for Vocational Education Research. Findings from these showed the relatively higher uptake of e-learning in enterprise training programs. For this reason it was decided to collect information from two organisations known to have high levels of e-learning opportunities. QANTAS and The Banking Corporation: South Australian Region, provided information for the study.

Although information about state-based approaches to putting courses online have been examined in this study, we do not concentrate on the TAFE Virtual Campus in Victoria and WEST ONE in Western Australia. We have chosen to understand what is happening with e-learning at the institutional and classroom level.

The case studies comprised a small sample of educational institutions and enterprises. These are detailed in table 17.

Table 17: Institutions and enterprises providing data for the study

VET institutions	Enterprises	Universities
TAFE SA Tea Tree Gully Campus	QANTAS	University of South Australia
OTEN	The Banking Corporation: South Australian Region	

Information from already published case studies was also used to inform the study. These case studies were part of a suite of studies undertaken under the auspices of the Australian Flexible Learning Framework.

Result of case studies

A. E-learning at OTEN

The Open Training and Education Network, part of Western Sydney Institute is the specialist distance education provider for TAFE NSW. It provides training for 38,000 students in more than 250 courses. Students are supported in their studies by 120 on-site teachers 700 off-site teachers, who mark and comment on student assessment. Most OTEN courses deliver qualifications under the Australian Qualifications Framework. Other courses are provided to meet specific purposes. OTEN also delivers an international program, which currently includes partnerships with colleges in China, Malaysia and Fiji.

OTEN has adopted a blended delivery model where all students, even those using print learning materials, have access to online support and administration. Each year there has been an exponential increase in the number of students providing (unsolicited) an email address on their enrolment form hence indicating they have access to the internet. In 2004 in excess of 75% of students provided an email address.

Of the 38,000 only 3,000 students study all their course using online learningware and the remaining receive their actual learning materials in print or on CD ROM.

E-learning systems at OTEN

The learning experience at OTEN (Open Training and Education Network) is unique. There is a high student teacher ratio compared with other TAFE Institutes – on average there are 200 students per teacher. Enrolments are continuous throughout the year and students work at their own pace. Generally there are no face to face interactions with or between students. Apart from in those courses that have practical workshops such as horticulture.

Students studying by distance education face a significant number of challenges because of this physical separation from teachers, support staff and other students. These can be categorised as challenges associated with communication, motivation, feedback, support and ease of administration. OTEN's e-Learning and e-Business systems have been developed to specifically meet these needs.

Students can access course information, request information about studying by distance education and enrol online. Students can enrol from November to August each year and study at a pace that meets their personal, social and work demands. Once enrolled, all students can access the OTEN Learning Support site (OLS). The OLS is integrated with OTEN's inhouse student administration and management system (SAM) and also Janison which is used to deliver online courses and modules. This integration has been critical to ensuring sustainability and achieving maximum efficiency.

The OLS enables students to access a range of support materials, for example, Frequently Asked Questions (FAQs) past TAFE exam papers, practice exercise, useful links and assessment information. Those students who have internet access can now have 24 x 7 access to a level of support previously not available. The OLS has web support pages for every course (240) and module offered by OTEN (1,500). These pages are managed by teachers who use them to provide additional information and resources and may also include a discussion board where they can communicate with other students studying the same module.

Students can update their contact details and provide other accurate demographic information which is so critical in a distance education environment. There are currently up to 28,000 student visits per month to the site, and in 2003 a total of 12 000 changes were made to personal student details via this method. This represents a significant saving for the organisation and enhanced customer service for students.

The site also links to TAFE NSW's Student e-Services which provides on-line enrolment information including access to transcripts and academic records.

Preparing teachers and students for e-learning

The major delivery approach is self-paced learning. This means that students are able to study at their own pace and in their own time. There are no designated formal class groups and students may enrol at any time when it suits them. This means that students are responsible for managing their own learning and in some cases may choose when they can be assessed.

Professional development has been a key consideration in OTEN's blended delivery strategy. Initially staff who were engaged in e-learning programs were expected to complete the Introduction to Teaching Online (ItTO) course developed by TAFE NSW. Some also chose to undertake other training programs, including the Facilitating and Managing E-Learning (FAME) program. In 2004 OTEN developed the Learning Technology Series which has been designed to more effectively meet the technology needs of both teachers and clerical staff involved in the current blended delivery model.

OTEN also offers a mentoring program where experienced teachers help new teachers to understand the things that 'do and don't' work in the e-learning/blended learning environment. They help teachers to overcome the fear of technology and to see that technology used effectively can add value to the learning experience and also ease some of the administrative tasks which can consume valuable teaching time.

While access to the internet is not a requirement of enrolment in many OTEN courses, students who choose to study online must have an e-mail address, access to a computer with certain minimum specifications, and reasonable access to the internet. They must also agree to buy or access some specific textbooks. All students, including those studying online, are provided with guidelines for their course, and details on the availability of phone and e-mail help desks.

Counselling is provided to students via e-mail as well as by phone and in person. In addition, packages dealing with study and time management skills are also provided on the OLS.

Learning, assessment and evaluation methods

Apart from posting materials on the web that can be downloaded, students may log into bulletin boards or forums conducted in asynchronous time. Often questions that are shared by a number of students are posted on the bulletin board for discussion. In addition to providing educational guidance and advice, this sharing of common problems creates a sense of community amongst students which was previously not possible in the distance education context.

Frequently asked questions are also posted on the OLS web site so that all students have access to the questions and answers. Given the high student teacher ratio (200:1) and the self-paced nature of study, online FAQs, as a one to many communication tool, are a very useful strategy. Bulk email to all students in a particular subject or course is also an effective communication tool in this distance education environment. Email is also used to provide responses to questions, and requests for information from students.

Substantial feedback and fast turnaround on assignments are high priorities for distance education students. The OLS assessment area has been developed to streamline some of the administration processes around the submission, marking and return of assignments. When students are ready to submit an assignment they log into the OLS, check the box which describes the particular assignment they wish to submit, attach files then submit to OTEN for marking. They receive an auto receipt number and can use the OLS to check when their assignment was received and if it has been marked.

Formative assessment quizzes are currently available on the OLS site, and summative assessment for 24/7 (being available to the student 24 hours a day, 7 days per week) availability are being investigated. Information and online assessments for compliance with Continuing Professional Development (CPD) in courses such as Building and Real Estate will be available online later in 2005.

OTEN has implemented a standard response time of 24 hours for students to receive feedback for any question that is posed to the Teaching Section 'Help Desk'. Although the answer to solve the students question is

generally provided in this time span, there are times that the student will just receive notification that the question has been received and will be attended to at the earliest possible time.

The OLS also allows teachers to design and implement online student surveys as required. Surveys have been utilised recently to find out about satisfaction with the various on-line forums and also to gain feedback about the online study experience. Students have consistently provided positive feedback on the OTEN Learning Support site and made many useful suggestions for its enhancement. Teachers have indicated that there has been a decrease in the number of telephone calls they receive that are of an administrative nature, for example, about whether their assignment has arrived or how they can change their contact details, as this support is provided online through the OLS.

Strengths and weaknesses of e-learning approaches

Despite the considerable advantages that such learning affords for students, teachers and organisations there are also some challenges that need to be dealt with.

Strengths

The major benefit for students of e-learning and in OTEN's case, blended learning, is the instantaneous access to main and supplementary materials and support. For students undertaking distance studies, it means easy contact with other teachers and other students to solve problems, and to engage in collaborative activities from their computer. E-learning has added richness to distance learning and studying in isolation from other students. It has provided them with much needed peer interaction.

E-learning has meant a reduction in administrative duties for teachers, and increased decision- making. Teachers may communicate simultaneously with large groups of students by posting blanket e-mails to make announcements and to respond to frequently asked questions. They can control the way they interact with students and how they go about facilitating learning. Initial cost-benefit analysis of the OLS

indicate significant savings and teachers have indicated increased levels of satisfaction from a reduction in administrative duties.

The implementation of e-learning means that the system can demonstrate its innovation, flexibility and commitment to the building of a knowledge-based economy. In addition, it enables the system to fulfil its access and equity obligations. There are support areas on the OLS for indigenous students, women, students from non-English speaking background and students with disabilities. OTEN's Disabilities Unit is also looking into implementing voice e-mails for appropriate groups of students especially those with a particular disability. Any information that is essential for students to have is provided in hard copy form to those students who have not provided an email address on enrolment. In areas where students have slow speed access to the internet, they are supplied with a CD ROM of their online learningware as are prisoners who are not permitted to use the internet.

Students are interacting with advanced technology, and those who are not able to access a physical classroom also get the opportunity to engage in learning. E-learning using the Study Planner tool on the OLS enables the system to implement the concept of individual learning plans for students which OTEN's self-paced learning mode requires.

The on-line environment in this context, allows flexibility and what is known as '24/7' access which relates to being available to the student 24 hours a day for 7 days a week. E-learning in the distance education environment is one way to ensure that all people have access to training and support when and where they require it.

Weaknesses

Despite the many strengths associated with the flexibility and access to wide ranges of resources that e-learning allows, there are also a number of problems. These comprise lack of physical portability, financial costs and slowness of connections. For example, students studying online do not always have access to printed notes which also means that they are unable to read their notes on the train or bus while going to work unless they print them out. There are also the costs associated with hardware and

software required to undertake e-learning courses, and the frustration experienced with slow internet connections.

Although 24/7 access means that students can access learning and support whenever they wish, this may have negative consequences for teachers and for their ability to cope with workloads. To this end OTEN has implemented a number of initiatives including telephone, FAX and email Helpdesks in each Teaching Section and an email Technical Support helpdesk for OLS support and support for online students. Students are advised that they will receive a response to their email enquiry within 24 hours (except on the weekend).

For the TAFE NSW system as a whole the implementation of e-learning approaches is not an inexpensive option. There are the costs of the infrastructure required to support the technology, in addition to costs associated with provision of professional development.

In view of the rapid changes to information and communications technology, the challenge for OTEN is to maintain the level of support students require. The challenge for the teacher is to keep the online learningware up-to-date and to identify as many one to many communication methods given the high student teacher ratio.

Keys to success

For any institution wanting to implement e-learning it is essential that there is comprehensive professional development and support strategies as well as an effective IT support system in place. Students studying online need to be made aware of the substantial amount of time they will spend in front of a computer and the need to work in an ergonomically safe manner. For example, they will need to stretch their arms and backs before they start working, take regular breaks and exercise their sight.

What is also required is an organisational approach to the delivery of e-learning. In addition, teachers should avoid being at the beck and call of individual students at all times during the day. They should instead set up their work as they prefer, and allocate specific times when they will be available to answer on-line queries, or respond to telephone calls.

Teachers should also not work in isolation and should discuss their problems with other teachers. In this way they can share successful practices and avoid any pitfalls.

B. QANTAS college on-line

Qantas Airways is Australia's largest domestic and international airline and recognised as one of the world's leading long distance carriers. Qantas College is the corporate learning and development department of Qantas and provides a wide range of learning and development activities to Qantas staff worldwide.

In 1996 Qantas College conducted a trial of flexible learning delivery options and the following year aunched its own on-line learning program with three courses - Communication Skills, Conflict Resolution, and Handling Difficult Customers. These courses were delivered online and were supported by an online tutor who assessed the competence of each participant.

Initially, uptake of online delivery was slow due to limited access to the intranet / internet across the company. In 2000 a redesign of IT networks and applications across Qantas meant that online learning could be more easily accessed via workplace PCs. Today more than 80 per cent of the 37000 employees at Qantas have regular access to a PCs at work and also use this to access training. In addition, more people have computers at home and can access Qantas College Online via the internet.

Since 2000, there has been an exponential growth in the number of employees registering for on-line programs. Today 80 per cent of staff have registered and have utilised online learning to either complete compliance requirements, technical training or interpersonal skills.

From the outset it was clear that employees would have a broad range of educational levels and abilities, and computer skills. To assist with learning and help develop the basic computer skills necessary for on-line learning, Qantas established learning centres (dedicated PC equipped learning environments) in key operational areas. These Learning Centres are also supported by a qualified Language and Literacy coordinator.

Qantas College is a registered training organisation (RTO) allowing it to deliver accredited training under the Australian Quality Training Framework (AQTF).

A system of internal and external tutors provides course participants with learning support and assessment. Internal tutors are Qantas trainers who have the subject matter expertise, the technical skills, and any specified accreditations or licences to provide the training. External tutors are consultants who are brought into provide training in specialist fields or technical skills if there are no qualified internal tutors to do so. External tutors are generally used to deliver classroom courses.

The nature of Qantas online training

In general, on-line courses are mostly self-paced however some are supported and moderated by online tutors. All communication with tutors is by email. At certain times during the progress of the course the participant will have to interact with a tutor. This is either to report to a tutor about a workplace activity he or she has completed, or to undertake a quiz and to send and receive emails. Once the student has completed the course and acquired all the required competencies the tutor will assess the student as competent and sign off on the course. The training records of each student are then updated.

Where activities require workplace application of skills, managers and supervisors of participants are enlisted as mentors and coaches. These, too, will provide feedback for tutors.

Qantas College Online is hosted on a Learning Management System (LMS) within the Qantas network. The focus for online delivery is content, instructional design and engagement.

Courses available on-line at QANTAS

There are currently 130 courses delivered and assessed on-line with approximately 10 per cent of these requiring some practical work that is done off-line.

Qantas employees may register for courses in the following major areas:

Customer and business focus

Supervisory skills

Cultural awareness

Training skills

Language and literacy

Computer applications

Airports training

International fares and ticketing

Security training

Approximately 95per cent of those who start an online course for compliance requirements and acquisition of technical skills will complete the course. Completion of courses in interpersonal skills (which are generally longer and require greater personal commitment) is lower. In these courses about 60per cent of those who register for a course will complete it.

An individual's time commitment and motivation are the major barriers to completing online learning programs for students. Students must make the time to register in courses, complete assignments and communicate with internal workplace tutors. Other barriers for students include frustration with technology, lack of basic computer skills and limited access to PC's at their place of work or at home.

For some employees low levels literacy and language skills limit their ability to participate fully in this type of learning. However, for

employees working in jobs that require the completion of courses for compliance with certain standards, then they are supported to complete such courses. For this reason there are language and literacy facilitators at learning centres.

Strengths of online learning

The strengths of online learning for company training at Qantas are varied. Qantas staff are able to access free relevant training when it is required, by selecting from a number of options to suit their needs. They can also maintain the currency of their skills and knowledge and keep up with requirements of new legislation. As the majority of Qantas employees are on shift work, this one-on-one delivery method is the most convenient form of learning. Because Qantas College Online is an RTO they also have access to accredited training and AQTF qualifications.

On-line delivery enables the company to provide relevant training for large numbers of employees in a short time frame. This means it can ensure that the skills and knowledge of employees are current with legislative requirements, and are provided at times when they are required. In addition, on-line delivery means that shift workers can participate in training.

Weaknesses of online learning

One of the major weaknesses of a method that is based on self-paced independent learning is that it requires students to motivate themselves to commence and complete a program of work. For some it might be easier to spend a day in a training session.

Another limitation for both trainers and students relates to course content and display. If the material is not engaging (because the infrastructure does not support certain applications) then there is a risk that students may lose motivation and not complete courses. Lack of social interaction among students is another limitation of the online method.

Responding to individual queries is also more time-consuming for trainers. This is especially the case if learners who are working

independently and at a different rate, experience similar problems during the same course, and ask tutors to respond to the same questions.

The amount of time trainers and tutors need to spend with individual on-line learners varies. For some learners they will spend minimal time, while other learners will require much more effort and attention.

The cost of developing on-line content and subject matter and the cost of technology and software can be inhibiting for the organisation as a whole. In addition it is not possible for the company to provide each individual with access to their own personal computer.

Keys to success for Qantas

One of the most significant reasons for the success of online learning is the Qantas requirement for employees to meet certain compliance standards. This has mandated employee training participation and has meant that large numbers of employees have participated in training. In addition, the commitment to online learning from senior management has supported a culture within the company that this is how the majority of training will be done. Access to accredited training is also another key to success especially for shift workers.

Continuing challenges

A major challenge is how to provide access to computers for all employees. Not every employee has a PC at their desk or place of work. Not every tea room for employees is equipped with a PC.

There is also a limitation with the IT platform that will not support certain multimedia applications (for example – video).

Another ongoing challenge is the cost of development of online courses although this initial large expense is more than compensated by long term efficiencies.

C. TAFE SA, Tea Tree Gully Campus

Courses at TAFE SA, Tea Tree Gully Campus use a combination of learning approaches, including online delivery. However, very few courses are delivered purely online. Most courses use a blended approach to learning.

Students have access to a variety of e-learning tools to interact with teachers and other students. These include discussion boards, quizzes, and chat rooms. In the main, support materials for many courses are provided online.

An e-learning coordinator spends half of her time lecturing in her field of specialisation (design foundations) and the other half of her time in providing professional development activities to staff to enable them to develop online delivery skills.

Use of online learning tools

One of the major drivers of online learning at TAFE SA Tea Tree Gully Campus is the Australian Flexible Learning Framework, a five-year program, aimed at lifting the ICT skill levels of Australians. A sub-program is the LearnScope program which provides funds for staff to learn how to facilitate online learning and how to design online learning materials. Young students who have been used to using computers at secondary schools and in their daily lives (SMS technology and computer games) also provide a significant impetus for colleges to place material online. Another driver is the increasing use of digital technology in industry. This creates the need and the environment for students to build up their skills to present images on the web. There are also issues of effectiveness, with some things (including immediate access to reference materials) working better online than offline. Another driver is the belief that online learning improves results.

At TAFE SA Tea Tree Gully Campus, online and computer-based learning has become an important part of courses in business services, electronics, hair and beauty and digital media. The focus on blended learning has been evolutionary. As all teachers are responsible for

designing their own materials or buying them in, they have tended to incorporate online technologies into their face-to-face delivery. In addition, they have also found that students have a high need for social interaction with other students.

Students may access online quizzes, discussion boards and discussion forums. Here students can post comments or questions, and receive back comments and answers from teachers and other students in the same way. These discussion tools are conducted in asynchronous time. Chat rooms, allow for discussion to take place in real or synchronous time. Students become part of a discussion group by writing in a textbox. This activity requires substantial concentration and well-developed and speedy keyboard skills. Teachers have also found that mature-age learners are less likely to prefer chat rooms and discussion forums.

Courses for students and teachers

In general the online format is used to provide access to support material for many courses and programs, including Computer Fundamentals, Web Design Skills, Design A & B, and Computer Skills. In addition, materials used to raise awareness of equal employment opportunity issues are also placed online. Here students may post questions or comments on a discussion board for the Equal Employment Opportunity officer. Courses which are offered entirely on online learning methodologies are few, and include Certificate IV in Assessment and Workplace Training, a course used to provide accreditation to workplace trainers and assessors and to lecturers. An online assessment tool is available for electronic engineering students to self-assess their achievement of the key competencies.

Preparing teachers for online delivery

If teachers are going to be able to facilitate online learning they will need to develop the technical design skills to enable them to post courses, including assessment items, online. They must be able to design web pages and instructional materials that are attractive, and easy to follow. This means that they need to be adept at using effective colours, font

sizes, graphics and navigation materials. They also need to be able to understand the most effective ways to release materials on the web. Because they will generally work with other staff members to develop effective online programs, they will also need to have effective team skills.

In addition to developing the technical design skills required for placing courses on the web, teachers will also need to hone their existing instructional design skills and develop their online mentoring and communication skills. They will need to be able to facilitate online learning by moderating online group discussions, and ensuring that students have adequate and timely feedback. They will need to be able to mentor students who are mostly involved in a self-paced learning program.

Teachers must also develop the skills and knowledge required for tracking student progress through a course. They must be able to design quizzes which assess student knowledge, and also record the time and date that the test has been taken.

The Tool Boxes available from the ANTA website can be customised to enable them to modify existing materials so that they are suitable for online delivery, or can be used to help teachers develop new materials.

In 2004 staff from TAFE SA Tea Tree Gully Campus attended a series of courses run by Online Education Services which provides training for TAFE institutes in the whole state. These courses are aimed at providing teaching staff with skills for using the Janison Learner Management system, developing online courses, facilitating online courses, and complying with a set of protocols for web activities (called W3c).

The annual plan of TAFE SA Tea Tree Gully Campus describes various aims related to e-learning under its theme of innovation and learning. To this end teams have been asked to address online learning. A set of five projects were funded to get e-learning happening in various departments. Teachers in these various projects have been given assistance to get their courses online.

At TAFE SA Tea Tree Gully Campus it has been decided that the best way to get teachers to develop online courses is to teach them the concepts of designing the courses and to get them to create a word document of the content of the course and how they want students to navigate through the course. They can then have their courses enhanced by specialists in the media centre to translate the word document into html. This is because the specialists are quicker and better at doing this. Once this has been done, the course goes back to the teacher and the teacher will be able to make minor editorial changes. The college has found this approach to be the best. This also approaches the style of a typical multimedia company which has a team of workers, including programmers, flash animators and designers.

Strengths of e-learning

There are strengths with this form of learning for students, teachers and the college itself.

For students the major strengths of the approach rest in its flexibility. This means that they can study where and when they choose to do so. For those who are enrolled in courses where blended methodologies are used, online facilities expand the resources they can access. In addition, students are able to track their progress through a course.

Online learning also helps teachers address the different learning styles of students. For example, blended delivery combines face-to-face approaches with e-learning approaches. This suits students who like to be part of a learning group. However, courses which are mostly delivered online will also suit those students who like to work independently.

Online learning also helps to support the learning of key competencies like 'working with technology', 'communication skills', especially 'online communication skills' developed in discussion forums.

Teachers also benefit from the flexibility afforded by this style of learning; that is, they are able to work away from the office, and are also not tied to getting through a certain amount of activity in a three-hour classroom session.

They have a variety of support tools to place learning materials online, write materials which will enable them to give effective support to students. In addition, they will be able to train students to adapt to the online requirements of work situations.

For TAFE as a whole, e-learning offers the potential for teachers to share products and learning materials from the Janison database. This is going to be increasingly important with the establishment of three super TAFE institutes. In addition, providing access to online courses means that there is increased potential for TAFE to sell products and services in new domestic and international markets.

Challenges in the implementation of e-learning

The experience of TAFE SA, Tea Tree Gully Campus reflects the experience recorded in much recent research and indicates that the challenges facing organisations in the implementation of e-learning are focussed in four key areas.

Student skill level

Online learning relies on the ability of students to use technology. For example, there are problems associated with low- and high-level computer skills among certain course groups. At one extreme, there are those groups of students who have not had the opportunities to develop computer-based skills, such as middle-aged women returning to study At the other extreme, there are those students (usually younger) who have high level skills and who have come to learn 'game art' and may be far ahead of their peers at the start of courses.

In addition, written communication skills in the online environment need to be well developed. That is because, in the absence of visual cues, messages can be misinterpreted. Students who do not have reasonably well-developed literacy and time management skills may have problems adjusting to this study of independent learning. However, for students who are able to work in this environment, they can take their learning at their own pace.

Online learning can be a lonely experience, especially if there are no activities that require students to communicate with their peers. Teachers need to be able to use the online tools effectively both to create easy-to-navigate pages, and easy-to-understand instructions and to develop effective online activities that encourage communication and deep learning.

Technology

Although the college provides ample access to appropriate technology in well-equipped computer suites on campus, access to the right technology can also be a major issue for students. For example, students in rural areas still have problems in downloading materials because of limited bandwidth. This is especially problematic for those students who are undertaking a totally online course.

There are also concerns associated with the cost and availability of web tools for teachers to develop courses. For example 'Dreamweaver' is a common web development tool. However, due to the high cost of this software, the college has decided to use the Microsoft 'front page' program, also requiring a license. Providing teachers with access to such a program on their desk-top although costly, enables teachers to develop their own materials for uploading on to the web.

Teacher workload

There is an ongoing challenge to the implementation of e-learning in determining teacher workload. This applies to all TAFE teachers working in a non-traditional environment and arises from the specific terms of the industrial award that describes a teacher's workload as delivering between 18 and 24 hours of face-to-face classes per week. The increased flexibility required to respond individually to students, and to keep up with email and telephone communication. is not captured by the normal methods for determining teacher workload.

In addition it is a challenge to dispel the myth that more students can be taught by online learning, and that this in turn, will be more cost-efficient. However, in some instances teachers are finding that the number of hours

required for teaching using this methodology have increased rather than diminished. This has been difficult to quantify, partly because there is no visible classroom. There is a need then to increase the amount of flexibility in the regular week to ensure enough flexibility for online teachers.

Professional development for e-learning

Another issue is related to staff training. To date, much of the training has been concerned with the mechanics of technology and software. There has been little time devoted to online pedagogy, including instructional design skills involved in turning a print-and-paper-based resource into an easy-to-navigate-and-understand online resource, and facilitation skills especially in the area of moderation and facilitation of discussion forums or chat rooms. For many managers and teachers the challenge is to develop an understanding of how fundamental the changes in teacher learning styles need to be.

D. The Banking Corporation: South Australian region

The Human Resources department of the South Australian region of The Banking Corporation through its Training and Development Centre is responsible for training for employees in South Australia. The national office makes decisions on national training policy in conjunction with its regional organisations. The Banking Corporation is a major player in Australian banking.

Implementing e-learning

One of the major drivers of e-learning at The Banking Corporation is the need for banks and other financial services companies, to comply with requirements of the Financial Services Reform Act, and the Occupational Health and Safety Act. In 2001 the company decided to trial its e-learning platform to investigate how e-learning could be used for staff training including compliance training. The company decided that on-line

learning could be an efficient and effective way to capture information for compliance purposes. It also decided to place its courses on the web so that they could be accessed by staff at any time of the day. As a result online learning has been used to ensure that all staff have undertaken training dealing with financial services legislation, Occupational Health and Safety and Emergency Evacuation. There has also been management development programs delivered online. Course completions can then be used as evidence of compliance for licensing applications and reviews. Although there is no requirement for staff to complete courses out of business hours many staff members choose to do it at these times given that the e-learning platform can be accessed on the internet. By November 2003 there were 31 000 or so online course completions nationally. Today there are approximately 138 courses that are fully on-line.

Another major driver of online learning for existing workers has been the installation of the new transaction telling system which enabled all branch staff to access a computer at their place of work, to complete required learning modules.

High turnover of staff in some states has also influenced an increased focus on staff training based not only on e-learning approaches. The bank has decided to focus on recruiting new entrants with the appropriate attitude and to spend time training them to develop the skills that they will need for their jobs. Where in the recent past the thinking at The Banking Corporation was to cut down on the amount of time staff needed to spend in classroom training, today there is an emphasis on blended learning using online learning as a tool which enhances rather than replaces the human side of training.

Courses are divided into 10 major training program areas comprising Compliance, Customer service, Interpersonal skills, Leadership and management, Lending, Orientation, Induction, Personal Computers and systems, Product Knowledge, Sales, and Service, and other external courses relevant to individual development plans.

Preparing participants for learning including e-learning

To ensure that the bank has access to well-trained personnel who will stay with the organisation, there has been a focus on bringing together the best of classroom and online approaches. This has meant that there is a combination of classroom training and online learning (that is blended delivery approaches) for many of the courses that are delivered. For example, new tellers in metropolitan areas will spend four weeks in induction or orientation programs before they will move into a branch. During this time they will complete 35 online modules. Some of these will be all online, and some will also include some practical simulations. However, trainers are on hand to guide entrants through their on-line learning and through practical exercises. In the main, theory components are completed online and practical components are completed in face-to-face situations.

Other courses also use a blended learning approach to training, where online activities are accompanied by simulations, face-to-face workshops and other in-person activities. In the main, management training courses use such an approach. In such courses participants engage in pre-course activities (often on-line), attend face-to-face workshops, and undertake follow-up exercises. They are also expected to work with team members using online discussion forums.

Preparing trainers for on-line delivery

Trainers deliver face-to-face company orientation sessions and soft skills training (including communication skills, customer service skills, negotiation skills, selling skills etc). They are also involved in monitoring and coaching employees who are undertaking online courses. To help them develop online programs using the e-learning platform , instructional designers have had to attend courses to convert word documents into interactive online learning modules. They also use these sessions to discuss issues with other instructional designers.

Some courses have an e-learning component with an e-facilitator appointed as a coach for a certain course. The role of the coach is to monitor and encourage course participants for the duration of the course.

Although trainers have the skills required for facilitating face-to-face groups they needed also to update skills for administration of completion of on-line programs.

Trainers have also had to develop a good understanding of how to access different courses. To do this they have attended a half day program run by the bank's in-house e-learning platform administrators.

Developing the learning content

External and internal instructional designers are involved in developing on-line courses. Where in the past most of the online courses were developed in-house, today many courses are developed externally by commercial business partners. However, in-house instructional designers work with these consultants to ensure that materials are suitable. In addition, in-house instructional designers also work with the bank's legal department to ensure that compliance courses have accurate and current legal information in place. In-house designers also ensure compliance courses are written in plain English.

More and more departments desire programs tailored to the needs of workers in their areas. In addition, there is also a need to develop induction programs for specialist staff who join the company outside of general recruitment drives.

There has been active participation in AQF courses including trainers completing the Certificate IV in Workplace Training and Development. Call centre consultants may complete Certificates II to IV in Business Office Administration and the Diploma in Front Line Management. The organisation also supports staff completing degrees and masters qualifications.

Assessment

Courses are generally assessed online. Assessments comprise a sets of multiple choice, multiple select, true/false and drag & match questions, which students must complete to an 80% level of accuracy. If students do not achieve this accuracy level then they have to review the course and do

another assessment. Questions can also be weighted in terms of importance of certain topics or parts of the courses.

In completing their assessments for compliance courses (such as the Financial Services Reform Act) students do not know which questions are correct or incorrect. This is a legislative, not a bank requirement, which means that while some learners may become frustrated with this aspect of online learning, it ensures staff cannot simply copy answers from others or skip the content to complete their assessments.

Costs and fees

There is a flexible cost approach to participation in company training. However, particular departments who want an online program developed for their staff will be charged the cost of this.

The use of external consultants to deliver training programs attracts costs for departments, whereas internal programs with internal facilitators does not attract costs.

Strengths of e-learning

For trainers, one of the major strengths of introducing e-learning methodologies is that it reduces the amount of time to be spent in face-to-face activities. With the new focus on training to build the skills of existing and new workers, the use of online facilities in some courses frees up trainer time to facilitate new classroom-based courses.

Online learning enables the company to comply with legislative requirements and increase access to training and training participation for all employees. This is especially important for employees who do not work in branches.

On-line learning also enables the company to improve its image as a progressive bank and use this in promotional campaigns. Already the company has won major awards for its commitment to training including online training. The Training and Development Centre has also a higher profile now that almost all staff have access to personal computers, and to completing their training on the net.

Online access means that workers have an increased range and choice of learning options, and have access to their records electronically. This means that they can also depend on the accuracy of training records as all their training records are initiated automatically when they log on, progress through courses and complete assignments and assessments. They have immediate access to records and can check which courses they have completed and which courses are still to be done. This information can then be used to support applications for promotions or for other jobs within the company. The need to complete compliance-driven courses like Equal Employment Opportunity and Occupational Health and Safety, has also meant that there is a greater knowledge among all staff about these issues. Having online components to the management development course done by the managers of the future indirectly promotes the benefits of online learning to staff in general.

Availability of online technology allows trainers to place a substantial amount of underpinning knowledge or pre-reading on the net. This can be accessed by students and completed as pre-requisite to classroom-based learning. In this way classroom time can be devoted to practical training. In addition, because the online assessments are corrected automatically online this also frees up time for trainers to develop other training materials.

One benefit of an online approach is the interactive nature of course content. Another benefit is the cost savings in terms of travel and accommodation and time away from the workplace, that are achieved in providing electronic access to training for employees in rural and remote areas.

Weaknesses of e-learning

In remote locations slow down-loading times provided initial frustration for workers. This frustration also meant frustration for trainers, especially if trainees did not have access to a computer in their branches. There has been a conscious attempt to work closely with the IT department in the development and delivery of online programs, including IT-specific training. This has ensured IT support for upgrading the hardware required

to deliver efficient training services. The introduction of the new PC-based teller system provided easy access to computers for all staff.

Online programs are now generally developed by external Australian companies through a strong partnership approach.

The e-learning platform used by The Banking Corporation was developed by an large American company e-learning company. In pilot testing the program in the Australian environment, local problems have also informed the further development of the company's American system.

Another potential problem is the updating of compliance courses so that they reflect changes in legislative requirements.

E. University of South Australia

The University of South Australia has a population of over 30 000 students spread over five campuses. Although the university has decided that all courses will have an 'online' presence, it does not mean that all courses will be delivered online. However, there are few courses that are delivered purely on line.

The Flexible Learning Centre is responsible for providing professional development services and assistance to academic staff. It also provides general and career counselling services and learning support for domestic, international and offshore students.

The Centre is also responsible for providing on-line services support for staff and students. It has evolved from a centralised service centre for traditional distance education students to providing online services and in-person support for teachers and students.

Online services

In 1993 the university received funding as part of the quality round, to develop a future learning environment. This was specifically targeted to the implementation of a flexible, student-centred and technology-enhanced approach to teaching and learning.

The university decided to develop its own delivery platform. This decision was made because e-learning environments like WebCT and Blackboard were yet to be fully developed. The university needed an e-learning platform that could be easily integrated with e-mail, and existing databases for human resources and student addresses. It also needed to be large enough to cope with every university course and individual records for over 30 000 domestic, international and offshore students. Last of all, the platform needed to be easy to use and efficient in enabling access to all resources. The e-learning platform that was decided on was the UniSAnet facility.

Today UniSAnet represents the university's 'online presence' for its teaching and learning programs. This facility can be accessed on the internet and provides information on courses and programs, and advice on how to post materials online. It also provides information on courses that have online resources. The home pages for academic staff are linked to courses they teach and programs that are available. UniSAnet provides access to course content and learning resources, and enables students and teachers to communicate with each other in asynchronous and synchronous ways. There are resources to help teachers develop effective course evaluation instruments which provide teachers with a bank of core and optional questions to be used. Students may also complete course and teacher evaluations online, prepare online portfolios, curriculum vitae, and job applications. There are also online literacy skills and information on best practice for on-line learning. The facility also enables students to complete quizzes and submit assignments and receive feedback on these. The tracking of assignments is also done electronically, with students being able to submit assignments online, and teachers returning assignments in the same way.

The online site enables students, staff and potential students to access a centralised register of formal credit transfer arrangements between the university and other domestic and international institutions. It also provides historical information on credit transfer that has been requested by and granted to students.

Supporting students and staff in online learning

Students and staff can also access a range of other services on-campus or on-line through the university's 'Learning Connection' offices on different campuses or on the Learning Connection website. It provides resources, sessions and appointments to help students become independent and confident learners. It provides support for students whose first language is not English. It also provides career counselling, and personal counselling for students who are experiencing difficulties. For students with a disability, the Learning Connection will provide support to help them to overcome any study-related problems.   The Learning Connection also helps international students with study support or assistance with living arrangements.

The Learning Connection provides access to information, services and resources for staff. Staff can access resources to help them with their online teaching and learning activities. Staff also have access to an online adviser who will help them with technical issues related to online delivery.

The university's Information Strategy and Technology Services unit provides technological support for students. This includes access to on-campus computers and printers, e-mail and the university network, 'help' desk, wireless network, and IT policies, procedures and guidelines. Students may also access computers at public libraries.

Preparing students and teachers for online learning

Students enrol in all courses online. Here they are informed about the 'First Connection' which is a face-to-face and online induction program for all students. However, students who want to undertake online courses may also attend a hands-on workshop where they are provided with study tips. In addition, they are also provided with software training.

Students may also prepare for online learning by accessing the 'realitybites: online learning at uniSA' website. This online program provides students with a definition of the modern view of online learning which 'generally refers to using a computer linked to the internet via a

telephone line'. It then provides students with information about how to use emails to communicate one to one with other students and teachers, and the discussion group forum which allows communication between one person and many persons. The site also explains the use of other technological capabilities, including chat, listservs, instant messaging, video conferencing, audio conferencing. The site also provides access to a set of training tutorials.

In addition to leading students through the various stages of logging on to the UniSA's computer network, the site also informs students about ways to deal with the challenges of online learning. They are given hints on how to deal with social isolation by taking the initiative to develop social contacts online via e-mail, discussion groups and chat groups. Students also have access to interactive online tutorials to develop their ability to use the internet and Microsoft Word, PowerPoint, Excel and other Microsoft Office software. A list of other resources to help them in their studies is also provided. Online links to the UniSA library network allows them to browse and search for different online library resources and services. These include online training resources.

In the main, staff prefer to develop their own learning materials. To help them do this, the Flexible Learning Centre runs induction courses and hands-on workshops. Some of these are also available on the web. Staff generally begin to adopt online approaches by posting course content online and then gradually increasing levels of interactivity and flexibility. The Flexible Learning Centre has professional course developers to provide staff with technical advice on course design, and continuing support through an IT help desk. Each year the Centre will establish a contract with each academic division to provide services. There are also online support workshops for teachers.

Keeping in mind that the development of an online course might cost between $15 000 and $20 000, it has not been sustainable for the university to maintain a centralised production service. The philosophical argument supporting the devolving of responsibility for course development to teachers is that this helps to provide teachers with new skills.

Although there are no specific incentives to encourage teachers to take up online delivery for courses, part of their promotion procedures includes an evaluation of the flexibility of their delivery approaches.

Courses and programs

Although all courses have an online presence, there are few courses that are delivered purely online. In the main, most courses use a blended approach. To date there are 5573 courses that have some type of online learning resource associated with them.The UniSAnet' website provides information on courses in the different schools with web-based resources according to four different types of resources. The types of web resources recorded are interactive learning guides, asynchronous web-based discussions, quizzes and subject links which are hyper links to other websites which may or may not be on the UniSAnet server.

Subject usage of these resources ranged from 0% to 83% (see table 18). The schools which had the highest percentage of subjects using at least one of these different web resources were Medical Radiation, Occupational Therapy, Health Sciences Divisional Office, Health Sciences, Marketing, and Accounting and Information systems. These schools had at least 60% of their online subjects use these resources.

Table 18: Subjects with web resources by school or divisional office (%)

Schools	No. of subjects with web resources	%. of subjects with interactive learning guides, discussions, quizzes, and or subject links
Medical radiation	48	83.3
Occupational therapy	86	70.9
Health sciences divisional office	20	65.0
Health sciences	323	62.2
Marketing	68	61.8
Accounting and information systems	156	60.9
Computer and information science	195	57.9
International business	279	53.8

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Early childhood and family studies	56	53.6
Physiotherapy	159	51.6
Architecture and design	117	49.6
International studies	160	46.3
Advanced manufacturing and mechanical engineering	99	45.5
Education (Magill campus)	116	44.8
Business and enterprise divisional office	7	42.9
Social work and social policy	157	42.7
Education (Underdale campus)	219	42.5
Education	449	39.2
Pharmacy and medical sciences	265	39.2
Communication, information and new media	350	38.3
Nursing and midwifery	193	38.3
Physical education, exercise and sport science	103	37.9
Mathematics and statistics	134	32.8
International graduate school of management	159	32.7
Environmental and recreation management	88	31.8
Natural and built environments	364	31.3
Electrical and information engineering	259	29.7
Geoscience minerals and civil engineering	174	28.7
Aboriginal studies, aboriginal policy and management and Australian Studies	147	28.6
Whyalla (School)	51	27.5
Psychology	146	26.7
Art	147	26.5
Geoinformatics planning and building	257	21.0
Telecommunications research	1	0.0
Central student records	21	0.0

Source: Unpublished data from the UniSAnet website
<http://www.unisanet.unisa.edu.au/usage/index.asp?BY= SCHOOL>accessed
26 August 2004

If we take each of the web resources as a proportion of the total number of subjects using web resources (see table 19), then we find that almost three-quarters of the subjects involved the use of interactive learning guides, asysnchronous discussion groups, online quizzes and/or hyperlinks to other websites. The most frequent of the four types of web resources was the hyperlink to other websites. The least frequent was the online quiz. Just under a third of the subjects had incorporated hyper links (called subject links) into their delivery. About a fifth of the courses used asynchronous discussion groups, while just under a fifth used interactive learning guides. The use of online quizzes was minimal.

Table 19: Courses using interactive learning guides, asynchronous discussion groups, quizzes and subject links (%)

Type of web resource	No. of courses	% of courses
Interactive learning guides	1055	18.9
Asynchronous discussion groups	1218	21.9
Quizzes	179	3.2
Subject links	1717	30.8
Total number of courses	4179	74.8

Source: Unpublished data from the uniSAnet website <http://www.unisanet.unisa.edu.au/usage/index.asp?BY= SCHOOL>accessed 26 August 2004

An audit of online resources used in the eight schools of the Division of Education, Arts and Social Sciences provides further indication that the use of purely on-line delivery (that is, without face-to-face contact) is low or non-existent. Just 4% of all courses delivered in the division used purely on-line delivery methods. The top three schools with the highest percentage of purely on-line courses were the School of Communication, Information and New Media, followed by the School of Education, and the Unaipon School (see table 20). About an eighth of the courses in the School of Communication, Information and New Media and the School of Education used no face-to-face contact and relied on online delivery. For the Unaipon School and the School of International Studies, it was considerably lower at about 7%. For the remainder of the schools, the purely on-line delivery methodology was minimal.

Table 20: Courses with purely on-line delivery (%)

Schools	No. of courses with some online delivery	No. of purely on-line courses	% of purely on-line courses
Communication, Information and New Media	350	19	12.9
Education	449	18	12.2
Aboriginal Studies, Aboriginal Policy and Management, Australian Studies (Unaipon School)	147	11	7.5
International Studies	160	10	6.8
Social Work and Social Policy	157	7	4.8
Architecture and Design	117	1	0.7
Art	147	0	0.0
Total	1673	67	4.0

Source: Unpublished data from the uniSAnet website

<<http://www.unisanet.unisa.edu.au/usage/index.asp?BY= SCHOOL>>accessed 26th August 2004

 Unpublished data provided by the Division of Education, Arts and Social Sciences: Online database update instrument

Benefits of online learning

The major advantage of online learning for students is that it enables them to study at a time, place and pace that suits their life style, and work, and family commitments. Teachers are able to introduce internet resources into their courses and thereby enhance their teaching. This has changed the nature of delivery in those programs that are highly resource-based (for example MBA, and medical radiation programs).

The university stands to gain from cost-efficiencies presented by a style of delivery not dependent on physical infrastructure and reaching a wide audience. For multi-campus institution like the university of South Australia, online learning provides a medium for effective and coherent communication between the campuses.

In theory the capacity for online delivery of courses should increase the university's market share internationally. However, this is not the case. Offshore students, in the main, do not want to go to a university website they want to attend an actual course delivered by lecturers in physical classrooms or venues.

Problems and issues

Online learning is highly dependent on teacher and student access to appropriate equipment and software. It is also dependent on the availability of appropriate IT infrastructure (for example, broad band). Keeping up with technological advances and updating equipment and infrastructure can also pose very real problems for institutions if they have not budgeted for these costs.

In addition to appropriate technology, online learning is reliant on the IT skills and literacy of teachers and students. Teachers will need the skills, experience and confidence to make best use of the available hardware and software. They will also have to determine how much time and effort will be allocated to course design. For example, teachers will have to decide whether to use a simple or a highly sophisticated type of online presentation. If they opt for a more sophisticated presentation (including flashes, sounds, pictures, photographs, and or interactive communication features), it will require them to have a knowledge of html, and easy access to appropriate web design software (including, html authoring packages, and 'front page' and 'dream weaver' applications). It will also require substantial time and effort. Teachers will have to determine whether the time and effort required for adding sophisticated features is worthwhile in terms of improved learning outcomes and cost-efficiencies. This is sometimes difficult to do.

In leaving course design to teachers, there is a real risk of their 're-inventing the wheel', and not investigating already developed resources (for example, those developed by Open Learning Australia), and the possibility of sharing content and expertise with teachers from other departments and other institutions.

The issue of teacher workload needs also to be considered. To date the university has found that people are underestimating the time required to develop and deliver courses and provide feedback to students. The university is also currently undertaking a study of teacher workload.

Access and equity issues continue to be problems for some students. Although the university provides substantial computer access to students in the form of computer pools distributed throughout the university campuses, a recent survey of student course evaluations indicated that limited online access was an important issue for students. The student union has argued that online learning can be costly for students because it requires them to purchase computers, and specific versions of identified software packages, and to pay for the cost of printing materials downloaded from the web. The university provides access to 800 computers on campus.

Assessment is another problematic area for online learning. Although there are a variety of quizzes that students complete online throughout the course, final examinations are taken at physical locations where the university can arrange for appropriate invigilation. In this sense online examinations are treated in the same as traditional distance examinations. However the university is currently investigating how final examinations can be undertaken online.

Implications and lessons learned

These cases have examined the practical engagement with e-learning of five organisations, including three educational institutions, and two business enterprises. Although detailed information about e-learning was provided by the training departments of these two business enterprises, the core business of these enterprises was not training. However, both enterprises depended on a well-trained workforce to understand and implement government regulations, and to carry out job tasks. A number of lessons can be derived from these case studies.

From the outset, it is essential to understand that government funding and government regulatory activities have been major drivers of e-learning

uptake in business and educational organisations. For example, there has been major government support for organisations that adopt innovative and technology-based education and training. There has also been funding to provide professional development for teachers. The extent to which government funding continues to be available for the implementation of e-learning will continue to be a consideration, especially for educational institutions.

Other government influences are observed in the way business enterprises have implemented e-learning methodologies to ensure that staff are informed of recent changes to government regulatory requirements. In this way they can provide evidence that they have complied with government regulations. Although this approach to compliance is common, it remains to be seen whether online courses are the best medium for ensuring that workers understand their roles in implementing changed regulations.

It is also important to note that, in educational institutions (universities and vocational colleges), historical print-based approaches to distance education have incorporated the use of the internet (the major medium for e-learning) to improve, or replace, traditional communication channels and access to learning resources. The upgrading of telecommunication and information technology within businesses has also provided a reason and medium for introducing e-learning programs to large numbers of workers within organisations.

E-learning has been used to enhance traditional face-to-face approaches by improving access to a wide variety of resources, and providing electronic communication channels (including email, bulletin boards, synchronous and asynchronous discussion forums, and chat rooms) between students and their teachers. It has also been used to provide flexibility of access, especially for those students who may not be able to attend face-to-face classrooms. Nevertheless, students will have to be adept at independent learning if they are to complete the courses they commence.

This form of delivery has also been used to maintain an online presence for institutions, and to enable electronic access to, and maintenance of

core institutional functions, including enrolments, record maintenance, career and study guidance, and promotion of course information and materials. Moreover, it has enabled teachers and students to apply recent technological advances in telecommunications to teaching and learning. Keeping this in mind, it is essential to note that courses which are delivered purely online by universities or TAFE institutions are few. For businesses there is online access to most courses, but here, also, substantial face-to-face support is available for those who require it. At QANTAS, workers are allocated to an online tutor who monitors progress and provides answers to queries. At Banking Corporation, an initial focus on increasing e-learning activity for training new and existing workers has recently given way to ensuring that the company maintains a healthy balance between face-to-face and online learning. This is because the strategic direction is to recruit workers with appropriate attitude and spend time training them to the company's requirements. Currently, there is an increased focus on face-to-face training.

It is also clear that organisations who have considerable numbers of workers in occupations that historically have required low English literacy and numeracy skills will have to develop ways to help them undertake compliance courses via e-learning. QANTAS has staffed its learning centres (established in enterprise sites and associated facilities to provide access to online compliance and other courses) to help such workers with literacy and numeracy issues, and with basic computer training.

Literacy issues can also be problematic for educational institutions providing training for existing workers with low levels of English literacy and computer skills who are aiming to acquire specific industry qualifications or competencies.

For all organisations; the implementation of e-learning requires teachers (or their equivalents), trainers and students to embrace the new methodologies. Teachers and students need to believe that e-learning will deliver better outcomes than learning acquired via traditional face-to-face teaching, and be prepared to engage with the approach. Both groups will have to develop the skills to enable them to make best of use of the new

technology. Institutions will need to provide teachers with the required assistance and/or resources to help them develop such skills. They will also have to recognise the time that teachers are expected to commit to this form of teaching. Keeping in mind that the development of e-learning courses takes time, energy and expense, it is important that institutions establish databases of already developed courses, so that teachers can access these. This avoids teachers 'reinventing the wheel', and is also cost-effective. In addition, there will be a need for institutions to ensure that teachers and students have access to appropriate computers and other essential resources. Whether everyone needs immediate access to the most current software and hardware is a question that will have to be answered by administrators in terms of relevance, need and cost considerations.

E-learning methodologies require teachers to interact one on one with a great number of students. Although their use provides teachers with flexibility in when and where they do their work, it also means that traditional ways for calculating contact time will have to be revised.

The e-learning approach opens access to education and training for those who have traditionally been denied this access, either because distance has prevented them with engaging with formal classroom-based courses, or because their commitments have meant that they could not attend at designated times. However, it is may not be a panacea for addressing all access and equity issues. Access without appropriate guidance and support may not improve equity of opportunity.

V. Case studies

Korea

Design of case studies

The selection of e-learning organisations for closer investigation has been based on a consideration of the types of organisations in education and training currently engaged in the provision of e-learning in Korea. The education sector is represented by universities, while the training sector is represented by firms.

Large firms in Korea provide e-learning to their employees either through their own training human resource development centres, or by commissioning independent training companies which specialise in e-learning to deliver the training. Such training companies specialising in e-learning were established in Korea to respond to the need for online training of company employees.

In selecting these case studies we tried to reflect the diversity within e-learning providers in Korea. Among the eight cases there were three enterprise training centres attached to firms, three training organisations specialising in e-learning, and two cyber universities. In addition to being representative of the educational institutions or training organisations providing e-learning, these organisations are also highly regarded in terms of best practice in comparison with similar organisations.

To undertake a comparison between Korean and Australian providers of e-learning programs, it was important to select organisations in similar sectors. Universities and TAFEs were representative of the post-school educational institutions currently providing opportunities for e-learning, while training departments of large firms represented enterprise training. In Australia, there has been a tradition of providing access to education

and training to citizens even if they live far away from educational institutions. This has been the case for all educational sectors. To this end, universities have enabled students to undertake subjects through what has now been called distance learning. TAFEs have also provided such opportunities for students. With increased availability of internet technology and computers for educational institutions and students, online solutions have been gradually incorporated into traditional distance programs.

Table 21: Selection of e-learning case organisations in Korea

Types	Name of case study organisation	Notes	Industry sector
HRD centres attached to enterprises	POSCO HRD Centre	Enterprise training centre attached to POSCO Inc.	Steel industry
	Samsung Life Insurance (Inc.) Human Centre	Enterprise training centre attached to Samsung Life Insurance Inc.	Insurance industry
	Korea Telecommunication(Inc) HRD Centre	HRD centre attached to KT	information technology industry
Training centres specialising in e-training	CREDU		
	Samsung SDS		
	Cyber MBA		
Cyber universities	Seoul Digital University	Cyber universities— 4 year	
	Young-jin University	Cyber university— 2 year	

For the cases selected both in Korea and Australia, we conducted an in-depth interview based upon the same interview schedules attached to this report. When necessary, slight modifications have been made with the original interview sheet to accommodate the different arrangements in each country.

In the main, interviews with case study organisations have been conducted at two levels: one at the level of the entire organisation and its overall approach to e-learning, and the other at the level of specific individual programs. At the overall organisation level, we interviewed managers and support personnel responsible for planning and administering e-learning programs. At the individual program level, we interviewed the instructor of the program. The structure and content of the interviews for both of these groups were similar. For each organisation, a number of interviews were conducted in person and by telephone. In addition, organisations provided short written reports in answer to questions in the interview schedule. The information was then organised under headings which dealt with the major features and issues related to e-learning. These comprised the following:

- overview of the organisation with regard to e-learning

- characteristics of the learning population (trainees)

- types of major programs offered

- overall operation and management of e-learning and its strengths

- development of e-learning contents and materials

- teacher training and quality of e-learning teachers

- delivery methods

- evaluation of trainees (learners) and exchanging feedback between teachers and trainees

In addition, each case study also described the recruitment of trainees, the availability of e-learning infrastructure, and organisational suggestions for improvement.

Result of case studies

1. In-house training centres

A. POSCO HRD Centre

Overview of the centre

POSCO HRD Centre is the in-house training centre of POSCO, which is the leading steel company in Korea. The centre provides both online and offline programs for POSCO's executives and employees. In 1999, the centre first conducted an analysis of the overall effectiveness of offline education at the company level. The result made the planners of training recognise the limitations of offline education. This realisation, along with the rapid development of information technology, helped POSCO consider adopting e-learning programs as a major means of delivering off-the-job training. Starting in 2002, the centre began to offer most of the programs online (see table 22). At the POSCO HRD Centre, e-learning programs have been introduced later, compared to other in-house training centres. However, the centre has provided direct learning to the employees from the server since 1980s, which means it has a considerable experience and history with e-learning-type training. Currently, online training at the centre accounts for more than 90% of the total training offered.

Table 22: E-learning services offered by POSCO e-campus

Internet online learning	Web-based learning, which transcends time and space
	  - Online learning to support self-directed learning
	  - Communication between learners and tutors

CBL
(Computer-based learning)
	Classroom learning that offers a PC for each person
	  - Paperless classroom learning using information technology
	  - Digital learning methods, such as electronic materials, diagnoses, simulations etc.

Distance learning	Improving work efficiency by enabling learning wherever the learner is.
	  - Prompt information-sharing without constraints of time or space (Pohang/Gwangyang/Seoul)
	  - Internet educational broadcasting service (real-time, VOD service)

KMS
(Knowledge management system)
	Promoting organisational learning for knowledge management.
	  - Work-related know-how Database, individual know-how Database, Question & Answer Database
	  - Providing a variety of information by utilising outside databases

Characteristics of trainees

Manual workers at POSCO work under the three-shift system. Thus they have enough time to participate in lifelong education programs for their personal development. As for the executives and employees, 22% received university or higher education and 78%, two-year college or lower education. The average age is 41 years and the average working period is 17 years. Regular employees account for 98% of the entire workforce and temporary contract workers, 2%.

Core programs

The major programs offered by POSCO e-Campus include technology training, leadership competency, work-related competency, information technology-related competency, and global competency programs (see table 23). For the second half of 2003, the completion rate was 88.7% (progress in the coursework 40%; tests/assignments 60%; final grade 70 points) and the learners' satisfaction level recorded 4.07 out of 5 points possible.

Table 23: Major online programs offered by POSCO e-campus

Program	Number of courses	Course titles
Technology training	33	Repair skills (machinery): 11 courses, including Bearing Repair, Pneumatic Control, Hydraulic Control etc. Repair skills (electricity, measurement): 11 courses including, Basic Electricity, Measurement Sensor etc. Operational skills (common): 11 courses, including Basic Knowledge of Steel, Steel Manufacturing etc.
Leadership competency	27	Leadership by Level: 4 courses including ACE, TEAM, CAP Leadership etc. Management Competency: 23 courses including Planning, Empowerment etc.
Work-related competency	23	6 Sigma: 5 courses including DMAIC, DFSS, MINITAP etc. Work-related: 18 courses including Fair Trade, Safety Management, Environment Management etc.
Information technology-related competency	22	IT: 13 courses, including internet, JAVA, HTML, etc. OA: 9 courses, including Office 2000, Office 2002, Win XP etc.
Global competency	96	English: 59 courses, including Live English, IT English etc. Japanese: 17 courses, including Japanese Basic, Japanese Intermediate etc. Chinese: 20 course, including Chinese Basic, Chinese Intermediate etc.

Characteristics of e-learning operation and its strengths

One of the strengths of the e-learning programs offered by POSCO e-Campus is that the programs are learner-centred. The centre has a group

of e-learning specialists (four committees and advisors) and focuses on developing performance-enhancing programs.

Also, POSCO e-Campus maximises the effectiveness of the programs by utilising the ISD model and the 6-sigma program development process. The centre is developing and operating the e-survey program to analyse learners' needs and measure the degree of practical application of their new skills. Not only that, the centre: i) verifies the program effectiveness by measuring returns on investment in training; ii) supports individual learning through counselling; iii) aids learning using the KMS (Knowledge Management System); iv) provides the blended learning method; v) supports a variety of learning methods by using multimedia (distance learning, real-time lectures); vi) links the learner's in-class hours with his/her performance ratings; and vii) provides incentives for learners who have completed the programs.

Development of e-learning contents at POSCO HRD Centre

Thirty-two per cent of the entire e-learning content (POSCO's core and strategic programs—technology training, leadership competency and work-related competency programs, and 6-sigma) has been developed in-house, but 68% (general programs—business administration and global competency programs) has been purchased from the outside or provided by application service providers. The focus in developing e-learning content is to clearly show the special characteristics of online learning and to offer self-directed learning, the core of e-learning.

The letter 'e' in e-learning has a lot of symbolic meanings. The goals of e-learning include: i) encouraging learners' voluntary engagement in learning activities ('e'ngagement); ii) encouraging learners to express their opinion on the results of their learning activities ('e'ncouraging, 'e'xpression); iii) providing interesting and useful edutainment; and iv) offering unique learning experiences that can be clearly distinguished from offline learning. Thus, e-learning content is developed in consideration of these goals.

There are two main models for content development: the ADDIE (Analyse, Design, Develop, Implement, and Evaluate) model based on the ISD (Instructional System Design) theory and the 6-sigma model. The ADDIE model has been modified to accommodate the situation of POSCO, and the 6-sigma model has been using the results of POSCO 6-sigma projects.

E-learning teachers

Currently, there are about 150 instructors. When an instructor is needed, POSCO employees are asked to apply for the position. The applicants should be doing the program-related work at POSCO, and their specialty and teaching skills are reviewed by the Instructor Selection Committee. Tutors must meet the requirements from the Ministry of Labor and should be POSCO employees, except in special cases.

The instructors must complete the offline programs for instructors, particularly the programs related to what they are going to teach. Since 2004, the instructor programs (basic and advanced programs) have been offered online, and offline workshops have been held twice a year.

E-learning infrastructure at the centre

The infrastructure of POSCO e-Campus includes hardware, such as a web server, DB server, video server, security server, disk array, network, and Pentium 4 PC for the operator. The infrastructure also includes software, including various software programs needed for the basic operation, and graphics, audio, video EDIT, FTP, HTML EDIT and remote control programs for the operator's PC.

Recruitment of trainees

Executives and employees of POSCO and related companies can sign up for the programs at any time of the year. When signing up, the applicant has to register his/her record in the personnel database. If the applicant works at a related company, an official in charge of personnel training at that company will register necessary information for the applicant.

The basic direction of POSCO's e-learning program design is similar to the principles of e-learning content development, mentioned above. That is, e-learning programs are designed to offer a unique learning experience that can be clearly distinguished from offline programs, and to implement the self-directed learning process by providing opportunities for learners to choose what they will learn. In addition, POSCO's programs focus on simulation-based learning so that people learn from failure. Also, the programs are designed to provide deep learning by using the most effective teaching–learning strategy for what the learner will learn.

Evaluation of trainees and getting feedback from them

The grading criteria include the final test, progress in the coursework, assignments, discussions, participation, in-class hours, and unit tests (see table 24). The evaluation is based on Donald Kirkpatrick's evaluation model and consists of five steps. In addition, a survey is conducted among learners to evaluate the programs.

Table 24: Evaluation/grading criteria of POSCO e-campus

Criteria	Description
Final test	Learners can take a final test when they complete 90% of the coursework. They must take the test before the course ends.
Progress in the coursework	The learner's progress in the coursework is included in the evaluation/grading criteria.
Assignments	Assignments submitted by the learner are included in the evaluation/grading criteria.
Discussions	The learner's discussion performance is included in the criteria if discussions are needed to improve learning.
Participation	The learner's utilisation of the Q&A, discussion, and course materials rooms is included in the evaluation/grading criteria.
In-class hours	Actual in-class hours
Unit tests	The learner's grade on each unit test

Feedback on the final tests are provided when the appropriate answers to questions are made available. Each answer is offered, along with feedback. Feedback on the assignments are given to individual learners by instructors. Feedback is offered through bulletin boards, mail, or short

message service (SMS). Answers to questions from learners are provided as they are required.

Room for improvement

In order to enhance the effectiveness of the e-learning program, POSCO e-campus has further work to do. The centre needs to: i) strengthen service for learners; ii) provide personalised learning experiences; iii) implement intelligence solutions in order to provide convenience to learners and improve the program development; iv) focus on nurturing e-learning specialists; and v) facilitate information exchanges among companies, universities, and government agencies.

B. Samsung Life Insurance (Inc.) Human Centre

Overview of the centre

Samsung Life Insurance (SLI) Human Centre is one of the in-house training centres of SLI. The centre aims to strengthen competency of employees through Samsung Learning Cyber University (SLCU). It provides in-house training and outsourced training. Learners include executives, employees and sales staff, not only from SLI but also from subsidiaries, partners, bancassurances, and affiliated banks. In 2003, a total of 154 programs were offered and 36 000 learners (15 000 executives and employees, 5000 from the sales department, 15 000 from bancassurances, and 1000 from subsidiaries) completed the programs.

Core programs

Currently, a total of 150 programs, including 100 outsourced programs, are being offered. The programs can be divided into leadership competency, work-related competency, and global competency programs. Ten per cent of the entire programs are using the blended learning approach. Twelve programs, including the AFP (Association for

Financial Professional) program, are being offered on and offline, and three programs, such as the financial literacy program, are being provided online as well as through the knowledge management system. The blended learning programs will be further expanded.

The AFP program is an AFPK (Associate Financial Planner Korea) exam preparation program and consists of seven courses, such as insurance planning and investment planning. At SLI, the AFP program has to be completed before becoming an assistant manager or to get an advantage in becoming a manager. The ongoing Cyber AFP program is a 16-week program and has 168 learners and seven tutors. Each tutor is responsible for 24 learners.

The Basic Training Program (BTP) is for sales staff. The program is using the blended learning approach. It offers offline training, and then provides online training. Another important program is the work-related program for female employees, a required training program for female workers in the sales department.

Development of e-learning contents

Program content in SLI's core business areas (insurance or finance) is developed in-house, but program content in other areas (business administration, general knowledge, language and information technology) is outsourced.

The process of in-house development includes program planning, needs analysis, teaching strategy planning, evaluation planning, content development, design and review. After necessary and sufficient discussion between a web developer and the Teaching Strategy Planning Team, a new e-learning program is developed. If the SLI Human Centre decides to outsource content development, the centre conducts a work analysis and chooses an appropriate course. Then, outsourcing companies submit suggestions. The Content Review Committee, which consists of SLI specialists, selects the best suggestion. Then, a new system is developed.

E-learning teachers

In the case of the in-house developed programs, experts at SLI are selected as Subject Matter Experts (SMEs) or tutors. Instructors must have a qualification certificate in related fields, or have five or more years of work experience at SLI. In the case of the outsourced programs, tutors are selected from SMEs, from people recommended by general managers, and from applicants themselves. Once selected, tutors need to complete the training program for new tutors. Also, tutors receive supplementary training every six months, and have workshops whenever necessary. To teach online, instructors must have required qualifications. Instructors teaching offline have to take required cyber courses to become a tutor.

E-learning infrastructure at the centre

The management of the e-learning information technology system has been outsourced to Samsung Data System(SDS) e-campus. The system, managed by five experts has five servers, which enables 1000 learners to be connected at the same time. That means 8000 learners a month and 100 000 a year are able to access the system. Furthermore, a video streaming service is also provided to ensure the smooth operation of the e-learning program.

Delivery methods and evaluation of trainees

The program is delivered through the internet, video lectures, html and flash animation. The AFP program utilises tutorials. Learners are always provided with study guidelines, including lists of past examination questions, and sample questions that may appear on final tests etc. Learners and tutors exchange information through email, SMS and bulletin boards. Study manuals are also provided for learners. These provide weekly study plans, weekly study objectives, and key points of the course content.

In addition, tutors and learners can interact and share information via the online question and answer (Q&A) room, papers, the course materials room, and email. Learners' questions are supposed to be answered within

24 hours. SLI's Memopad program and the homepage bulletin board are also used for tutor–learner information exchanges.

In the Cyber AFP program, an orientation session is conducted on the study manual and the AFPK exam before the learner commences the course. Along with the online learning, the learner receives offline schooling and preparatory training for the AFPK exam. Also, offline AFP classes are held every week by in-house instructors who have AFPK qualification certificates.

Twice a week tutors send encouraging emails to learners who fall behind in their work. Once a week they also send out study materials. Every other week, tutors conduct telephone counselling sessions for learners. Tutors are required to provide learners with feedback on questions, assignments, or discussions within 24 hours.

Learners provide feedback on the quality of the course by responding to an online survey, when about 90% of the course has been completed. The survey comprises questions which deal with learners' satisfaction with the course, goal achievement, practical application, tutors, instructors, content, system, and recommendations. The survey results are taken into account when improving the program and evaluating tutors.

Obstacles to e-learning delivery

The learners have diverse ages and positions. Thus, some of them may have difficulty using the internet. To prevent such problems, an orientation is conducted on how to use the internet before the program starts.

In online learning, learners may experience feelings of alienation. That is why interactions between tutors and learners are important. The program manager needs to assign a reasonable number of learners to each tutor.

Success of an e-learning program depends on instructors. Instructors have to play a role not only as teachers but also as assistants. Also, instructors need to analyse the program content, provide information on such content, and act as a knowledge manager.

C. Korea Telecommunications Human Resource Development Centre

Overview of the centre

Korea Telecommunications HRD Centre established the internet environment earlier than other centres. In 1994, the centre began to offer the Conet service. In 1997, it changed some of the offline training courses into online ones. In 1998, KT HRDC established the HRD (Human Resources Development) system. In 2001, it launched full-scale e-learning programs. In 2002, the centre launched mobile learning programs, and next year, it plans to implement the SDL (self-directed learning) process.

The centre focuses on areas where learners can participate actively and voluntarily, and provides e-learning programs for KT employees from affiliates and partners.

Characteristics of e-learning programs

Characteristics of e-learning programs offered by KT HRDC are as follows.

First, programs are developed using the KT-WBISD model. The model specifies important information needed for the systematic design of web-based learning programs.

Second, e-learning programs are offered through excellent infrastructure. The server duplexing enables a stable e-learning environment. The LMS (learning management system) was developed in house, so it can be modified and extended easily.

Third, the personal career development planning (CDP) system is in place. Under such a system, employees list their personal development plans. After a certain period of time, senior officials check whether such plans have been implemented and link the results to the employees'

performance ratings. The system provides an incentive for employees to engage in personal development activities.

Major programs

Currently, the centre is offering work-related qualifications in programs such as information/OA, and self-learning programs. One of the major programs is the ADSL Guide program. The program was developed to facilitate the rapid growth of the high-speed internet service and to enhance employees' competencies in the area.

E-learning teachers and trainees

The e-learning instructors are KT employees who meet specified requirements. They receive training for e-learning staff. Any KT employee can apply for the instructor position, and the number of instructors needed in each area should be ten or fewer. Applicants should be an expert in the related fields, and have teaching skills, a master's or higher degree, three or more years of work experience in the related fields, and/or be a vocational training instructor. Instructors are paid accordingly and can participate in various seminars and workshops. Outstanding instructors are given opportunities to receive extra training, either in Korea or overseas.

Evaluation of trainees

The grading criteria include course participation, and performance on papers, unit tests, and final tests (see table 25). The qualification certificates or certificates granted to the learners are recorded in the personnel management system. Before the program ends, the centre conducts a survey among the learners to obtain feedback about the program which is reflected in the development of future programs. Feedback for learners is provided in each department.

Table 25: Evaluation/grading criteria and standards of KT HRDC

Criteria	Period	Standards	Frequency	%	
Participation	From beginning to end	Number of hits on the course website: 20, in-class hours: 20		40	Required
Papers	Middle	Evaluation by instructors	1	20	Required
Unit tests	Middle	Multiple-choice questions: 20, maximum score: 100	1	20	Elective
Final test	Before completing all the coursework	Multiple-choice questions: 20, maximum score: 100	1	20	Required (40)

Room for improvement

KT HRD Centre staff are of the opinion that there is still has room for improvement in a number of areas.

First, programs need to be developed promptly so that such programs are provided in time. In this regard, government support is essential. Recently, KT adopted m-learning (mobile learning) technology to respond to the changes required for the delivery of e-learning programs.

Further, there is a need to maintain a steady pool of trained online and offline learning specialists. Currently, each content manager is responsible for more than ten programs and approximately 10 000 learners a year.

In addition, the number of required e-learning courses to be undertaken for different positions should be specified. The number of courses taken by the learners must be reflected in promotion decisions.

2. Private training centres specialising in e-learning

A. CREDU

Overview

In 2000, Credu became an offshoot of the Samsung HRDC. The major business areas of the company include e-learning services, program consulting, program development and sales, system establishment and sales, and overseas business. Today Credu is a leading e-learning centre in the nation. Its e-learning services can be categorised into two groups: providing e-learning programs for companies, and operating a Cyber Graduate School in collaboration with universities.

Major programs

'Business to Business(B2B)' e-learning programs account for the largest part of the entire programs offered by Credu. Credu is now providing about 350 programs for company employees. In the case of 'Business to Client(B2C)' programs, Credu is offering the iMBA(internet MBA) program in cooperation with the Graduate School of Business at Sungkyunkwan University, teacher training programs, financial literacy programs, language and information technology programs, and e-learning specialist programs.

CREDU has adopted web-based instruction for all e-learning programs. It is also using the blended learning approach to offer clients both online and offline training. This is to ensure the effectiveness of the programs.

Aside from the major programs mentioned above, there are special programs for company employees, including leadership, management

innovation, work-related, information technology, service/general knowledge, language, and MBA programs.

One of these programs is the Samsung e-Green Belt program, a strategic program developed in response to the need for the Samsung Group to implement 6-sigma standardisation. The program enables the practical application of new skills through problem-solving exercises. At the end of the program, learners take an e-test. If the learners pass the test, they get a qualification.

One of the main programs in the Cyber Graduate School is the iMBA program. To receive a degree, learners have to complete 30 credit hours over five semesters. The specific processes of the program are similar to those used in offline programs.

Development of e-learning contents and materials

CREDU uses the Networking-ISD model to develop the content of online programs. The development process involves the analysis of the needs of learners and the operating environment, program planning, program design, storyboard making, pilot testing, content review, and editing.

Credu selects e-learning instructors from its own labour pool, and conducts online instructor training once a month and offline workshops once a year. Through such training, instructors learn how to use the learning management system, understand the role of tutors and tutor pay rates, develop tutor activities, and form their own community. For new tutors, OJT (on-the-job training) is given. Such OJT is concerned with tutors' roles and guidelines and how to use the Learning Management System.(LMS) There are three three-hour training sessions before the e-learning program begins.

Recruitment of trainees and operation of e-learning programs

Once the programs are ready, the registration dates are set. Companies may choose from the prepared programs or ask Credu to develop new

programs. In the case of individual learners, they can visit the homepage and register for the programs they want.

There are program managers who take care of all the processes during class hours. Some program managers are responsible for sending emails or making phone calls to ensure that learners who fall behind do their coursework as scheduled. Also, a week before the assignment submission date, learners get emails and phone calls to remind them to do their assignments. (In addition, there are other program managers who help remotely located learners under the nine-touch management policy described in table 26.) System managers operate the automated monitoring system and the help desk 24 hours a day to eliminate system errors as they occur.

Table 26: CREDU's learning encouragement process

Step	Description	Medium of communication
1	Welcome messages and introduction to the program	Email
2	1st week learning encouragement	Email
3	Encouragement message for those who haven't read the email sent in Step 2	Phone
4	2nd week learning encouragement	Email
5	15th day learning encouragement	Phone
6	Encouraging the submission of papers	Email
7	Encouragement for those who are not likely to complete the program	Phone
8	Explanation of completion standards and final encouragement	Email
9	Messages regarding program completion and registration for other programs	Email

Delivery methods

The teaching methods used in e-learning programs (see table 27) include tutorials and Goal-Based Scenarios (GSBs). Today there is increased use of blended learning processes. This means both online and offline lectures are provided. Programs can be also be divided into text-based, video-based, and animation-based programs.

Table 27: CREDU's e-learning teaching methods

	Tutorial	**GBS**
Learning process	Information presented → assignments	Assignments → information → instruction provided
Types of information	Organised, general content	Distributed specialised/contextual content Provided in the workplace
Setting learning objectives	Logical arrangement of fabricated learning content based on instructional goals	Contextual arrangement of authentic learning content related to assignments
Instructional theory	Gagne's 9 events (objectivism)	Schank's Dynamic Memory Theory (constructivism + objectivism)
Success factors	Minimising the learner's cognitive overload = enhancing learner efficiency →level of understanding Consistency among objectives, content, and evaluation	Stimulating learner cognition= enhancing learning effectiveness →level of application Meaningfulness among assignments, content, and roles

Evaluation of trainees

The grading criteria include the learner's progress in the coursework, assignments, and participation. The learner's progress in the coursework is checked automatically, and assignments are assessed by instructors. The learner's participation may be evaluated according to the number of items the learner has posted on the bulletin board or discussion room, attendance at offline meetings etc.

Room for improvement

For more effective e-learning program management, Credu should: i) continue its research to come up with a better design model; ii) develop an e-learning evaluation model; iii) provide on-going tutor-training programs; iv) implement the blended learning process on a full scale; v) develop programs that are independent of government ordinances; vi) overcome the limitation of the e-learning market; and vii) expand its information technology infrastructure.

B. Samsung SDS

Overview

Samsung SDS offers e-learning programs to more than 500 companies in the nation. Also, the company provides programs for individual learners through Samsung SDS Multicampus. Learners include executives and employees of Samsung SDS and Samsung Group affiliates, employees of more than 500 companies in the nation, and individuals who sign up for the programs through Samsung SDS Multicampus. Seventy per cent of the learners received university or higher education, and 30% high school or lower education. The learners' ages range from 20 to 50.

Major programs

Samsung SDS offers 150 information technology, 140 business, and 110 language programs. Major programs include 'UML for Beginners', 'HTML Homepage Making', 'Business Negotiation Skills', 'Web Development Series', and other information technology-related qualification exam preparation programs.

Development of e-learning contents

Samsung SDS develops programs by modifying existing program development methods in line with company needs, organising necessary methods and techniques, and standardising such methods and techniques. If Samsung SDS decides to outsource content development, the company invites tenders. For purchased content, the company has a quality control procedure in place.

E-learning teachers and instructors

Instructors must have a qualification in the related fields, a bachelor's degree and five or more years of work experience, or have a master's or

higher degree in the related fields. Tutors are selected among subject matter experts, people recommended by general managers, or applicants.

Eighty per cent of all programs are work-related. Such programs are developed and managed by Samsung SDS specialists. Briefing sessions are held on the development of new programs to ensure that program managers know the characteristics of the programs. In order to encourage tutors to work energetically, the company holds a Tutor of the Month competition, and briefing sessions on exemplary cases. It also pays rates according to the results of tutor evaluations and performance.

Recruitment of trainees

Around the 10th of every month, Samsung SDS posts information about program offerings on customers' homepages, or emails this information to clients. On the 15th to 25th of each month, individuals can visit the company's homepage and register for the programs. Company employees register through the officials in charge of training at their companies.

Delivery methods and media

Once the program begins, emails encouraging learning activities are sent to learners based on their progress in the coursework. Even after the program ends, the Learning Clinic Centre makes sure that the learners' questions are answered. The program managers also encourage the learning activities between learners and tutors through continuous monitoring. The teaching media include WBI, video, audio, and simulation. For the latest programs developed in-house (since July 2003), lecture notes are also provided.

Evaluation standards and exchanging feedback

Although different programs may have different grading criteria, on the whole, the criteria deal with progress in the coursework, and performance in assignments, discussions, and tests. In the case of the required programs for Samsung SDS, the learner's progress in the coursework accounts for less than 10%.

Table 28: Evaluation/grading criteria of Samsung SDS

Program	Criteria
IT	Progress in the coursework + assignments + tests
Business	Progress in the coursework + assignments or discussions + tests
Language	Progress in the coursework

Grading is completed within five days of program completion. Feedback is provided for the learners via email. Multiple-choice questions are graded automatically by the system, while other types of questions are assessed by tutors individually. Tutors also give learners feedback about their performance in assignments and discussions.

In addition, Samsung SDS sends feedback to training officials at each customer company about whether the learner has completed the program and the level of learner satisfaction with the program. Also, the learner can give feedback to instructors through email, phone calls and the bulletin board.

Issues and obstacles

Learners at Samsung SDS experience problems when they are unable to be connected to the system or have an unstable connection. Also, they tend not to ask questions because it takes too much time to get answers.

Instructors experience problems because it is difficult to create a lively learning environment when they are unable to see learners accessing lectures online. Also, it takes more time and effort for them to teach e-learning courses since they have to connect to the system frequently and check learners' questions and assignments.

For more effective management of online programs, there have to be additional managers who handle system-related problems and questions, and check learners' progress in the coursework. In addition, it would be helpful to use SMS (short message service) for questions and answers between learners and instructors.

In online programs, learners tend to neglect their coursework as time goes by. Therefore, it is essential for instructors to send emails or post notices

in order to encourage learners to do their coursework. Also, supplementary materials need to be provided. As for instructors, they should try hard not to neglect their lectures.

C. Cyber MBA

Overview

Cyber MBA is actively implementing the blended learning process. Cyber MBA is promoting the development of the HRD industry through high-quality content, high-quality service, and continuous research and development. Its business areas include: i) the management of on and offline business programs for universities, companies, and public organisations; ii) the development of online program content; and iii) the establishment of the learning management systems (LMS).

Major programs

Major programs include business administration programs for company employees, exam preparation programs for finance-related qualifications, MBA program for the Graduate School of Business at Ajou University, and MPA (Master of Public Administration) program for the Graduate School of Policy Sciences at Hankuk University of Foreign Studies. Currently, 80% of programs are online. In the case of the vocational training programs, most of the learners are company employees. As for the academic degree programs, learners are mostly company employees and self-employed people.

Development of e-learning contents

In the absence of available quality Learning Management Systems or Learning Content Management Systems, Cyber MBA has developed its own learning management system. Instructors participate in the e-learning content development. In the case of vocational training programs, the focus is on developing content which can also motivate and interest learners. As for academic degree programs, the content is more theoretical and lecture-oriented.

The first step in content development is to decide whether to develop in-house or outsource. The next step is to choose one of the four program development methods: the audio-oriented method, video-oriented method, WBI (web-based instruction), and SCORM (sharable content object reference model). However, the video-oriented method can provide difficulties in terms of editing and downloading processes. Thus, the audio-oriented method is usually used.

Characteristics of trainees

Between 98 and 99% of all learners are company employees, with the majority of these in the academic degree and vocational training programs. Just 2% of learners are in the finance-related and Certified Business International(CBP) qualification exam preparation programs.

E-learning teachers

Before the program begins, the program designers let the instructors know the characteristics of online programs. Program managers telephone learners to give them the necessary information about online programs. In addition, there are 20 program managers available to assist learners who have difficulties using the technology. They do this either through telephone phone calls or by visiting the learners' homes.

Evaluation of trainees and exchanging feedback

The grading criteria include performance on the unit tests and final tests. The unit test has four questions, the final test 20 questions. All the tests are administered online. But if asked, Cyber MBA may also administer offline tests. As the final grades are linked to the learners' performance ratings, the assessment must be objective and reasonable.

In the case of the academic degree programs, learners undertook take-home exams up until last year. However, from this year, learners have to take online exams. As for the vocational training programs for company employees, learners write papers, and take a weekly quiz and a final test with short answer questions. But the evaluation tends to be just a formality.

Room for improvement

Online programs pose some problems for both learners and instructors. Learners feel the programs offer too little interaction between instructors and themselves. Instructors feel stress because they have to prepare 30% longer and more thorough lesson plans than for offline programs. They also said they need more interaction with learners.

For more effective e-learning program management, Cyber MBA needs to have more e-learning specialists, support content development processes, and establish an effective learning management system and a dedicated server. To increase interaction between learners and tutors, it will also need to implement the blended learning approach. This approach would be based on information and knowledge being delivered online, and learners engaging in offline sessions to actually apply what they have learned to real-life situations. The learners' questions need to be answered immediately, and the interactions between learners and instructors should be increased through the formation of a community. The textbook should also not be too difficult or too long.

It is true that the employment insurance reimbursement policy has contributed to the initial growth of the e-learning market. But now it is distorting the market and creating inefficiency in e-learning programs.

3. On- line universities

A. Seoul Digital University

Overview

Seoul Digital University is a four-year university which was established by an association of 40 or so universities. The university attracts 150 000 learners a year, confers bachelor's degrees, and allows learners to graduate in three years if they meet requirements.

Learners must have high school or higher education. People with qualifications and contest winners receive incentives. Ninety per cent of the learners have full-time jobs.

The programs include university subjects, information technology training, lifelong education, MBC Academy, Digital Music Academy, and business programs. The programs check learners' attendance, hold Q&A sessions and discussions, and give and receive assignments online. Each college issues its own qualification certificates. Learners who major in education receive lifelong educator certificates. The programs consist of online lectures (99%) and offline activities (1%).

Development of e-learning materials

Seoul Digital University develops and produces 80% of the all teaching materials. First, instructors write lesson plans and provide these to the Digital Centre. Then, the centre develops content according to the plans. Administration, content development, and system management are partly outsourced (to the Maekyung Husdaq company). Instructors must have a master's or higher degree and work full-time. Instructors' work involves writing lesson plans, videotaping content, managing the Q&A room and discussion room, writing quizzes and tests, and grading these.

Operation of programs

The registration system of Seoul Digital University is similar to that of offline universities. But the school offers more courses and sample video lectures. Most of the lessons are provided online, and offline lessons are videotaped and also provided online. Interaction between learners and lectures occurs through the bulletin board, discussion room, and guest speaker functions. Courses may be taught by one instructor, several instructors, or one instructor with guest lecturers, or with instructors working as part of a team. Instructors manage ready-made courses.

Learners must get 140 credits and attend classes for 14 weeks. If the learner misses classes for four or more weeks, he/she will fail the course. Each college provides its own qualification certificates. The grading criteria include papers, assignments, quizzes, projects, and take-home exams. Feedback is given via the discussion room and bulletin board.

Room for improvement

Because Seoul Digital University provides e-learning programs, getting instructors' help when necessary and responding to feedback are not easy for learners. Instructors need to have additional special skills. They have to be familiar with the internet technology, learn how to teach naturally in front of the camera, and make an extra effort to prepare more intensive classes. The school should get the latest equipment ready for more effective online teaching and provide internship programs for learners.

B. Yeungjin Cyber College

Yeungjin Cyber College is a two-year cyber college, which was granted government approval in 2001 and began to offer programs in 2002. The school provides practical training for learners by utilising facilities at Yeungjin College.

The programs are managed by the offline college. Thus, any problems that arise can be taken care of immediately. In 2003, the number of learners at Yeungjin Cyber University was 600 and in 2004, 800. These

figures represent just 10% of the number of students at Yeungjin College. But Yeungjin Cyber College plans to increase the number of its learners to be equal to the number of Yeungjin College students. One of the major programs is the social welfare program.

Currently, the program content is developed in-house. In the future, the school may exchange programs with other e-learning centres, or adopt programs that have been produced externally. However, the school has not implemented the Sharable Content Objective Reference Model (SCORM) content packaging standard, making it impossible to use content from external sources. Therefore, there is a need for the school to install the SCORM standard in the very near future.

Instructors are selected from instructors at Yeungjin College and other two-year colleges. They must be able to teach two-year college courses (people with work experience in the related fields are preferred) and have sufficient computer skills. The school selects learners the same way as does the offline college.

Authoring tools are used to make teaching materials, and the internet is utilised to design and deliver instruction. The grading criteria include attendance (20%), papers/assignments/participation (20%), mid-term exams (30%), and final exams (30%). Learners provide feedback about the programs through the completion of program evaluation forms.

For more effective e-learning programs, Yeungjin Cyber College needs to: i) improve continuously the system of communication between learners and instructors; ii) offer a wide variety of content that clearly shows the special characteristics of online learning; iii) encourage offline activities like MT (Membership Training), sporting events, and exhibitions; and iv) promote the use of the bulletin board in order to increase exchanges between learners and instructors as well as among learners.

Implications and lessons learned

We reviewed cases of eight representative e-learning organisations in Korea. The cases reviewed include three in-house training centres, three independent training centres specialising in e-learning, and two online universities. The lessons and implications drawn from the case studies can be utilised toward improving e-learning in each organisation where the case study is conducted. At the same time, they can also be applied to help improve e-learning in all the organisations where e-learning is offered.

Although each individual organisation displays specific strengths and weaknesses in operating its system of e-learning, organisations also share common issues, common strengths and sometimes common weaknesses. In the following, we summarise the major issues and concerns raised and identified in case study interviews.

First, e-learning delivery has advantages over offline training delivery in that once e-learning programs become available and remain relevant, learners can utilise the programs repeatedly without incurring additional costs for providers. Despite these advantages, e-learning also has a major disadvantage compared with conventional offline learning. This is the lack of interaction between the teachers and the learners, which is a major strength of conventional offline learning. Most of the interviewees who participated in the case studies agree that if we are to improve the effectiveness of e-learning, a way should be sought to increase interactions between learners and instructors. The incorporation of some of the strategies used in offline learning, are recommended as a way to address this weakness. This is today often referred to as 'blended learning'. The implementation of blended learning approaches into e-learning models is a way to reduce the feeling of alienation among the learners and teachers, and to motivate student uptake of and active participation in e-learning programs.

Second, the development, maintenance and retention of the human resources specialising in e-learning is an important issue for the development of e-learning in Korea. While the demand for online education is steadily increasing in Korea, the training of the professional

e-learning specialists is increasingly becoming a critical issue. Case study organisations share common problems in securing human resources specialising in e-learning. Amid an explosive growth in the e-learning population, there is a need for the development of more specialists in e-learning. To train these specialists, on- and offline training programs for them need to be provided. Also, maintenance of the available human resources is important. Such specialists should be listed on a directory so that they can be utilised in time and so that they can be well managed. Additional administrative staff members are also needed to monitor learners' progress in the coursework and deal with system-related problems and questions.

Third, the importance of the role of the teacher in e-learning can never be over-emphasised. Teachers and instructors in e-learning play a key role in determining the outcomes of e-learning. Moreover, they are not only teachers of specific e-learning programs, but they are also facilitators and promoters of learning in general. Furthermore, the techniques and auxiliary methods they employ play a critical role in helping learners to achieve successful learning outcomes. Thus, the teacher should be able to perform the multiple roles of content analyst in cyber education, knowledge manager, and information provider.

Fourth, provision of customised learning programs and services to enable learners to meet their individual needs is important. This also means that there should be a variety of e-learning content developed in time to meet the diverse needs of the prospective learners. The e-learning contents need to be developed such that they can take full advantage of special characteristics of online learning.

Finally, government policies regarding e-learning need to be tuned more systematically to further help improve e-learning for employees, not just in terms of quantity, but also in terms of quality. It is true that the Employment Insurance Reimbursement Policy (EIRP) implemented by the Ministry of Labour has contributed to the initial growth of the e-learning market in Korea. But a criticism, also shared by our interviewees, is that it is now gradually distorting the market, thereby creating a source of inefficiency. There is a view that often, companies take advantage of this policy by just focusing on increasing the number of employees'

places in e-learning programs, rather than focusing on improving the quality of e-learning. Thus, to improve the quality of e-learning through EIRP, the government should make an effort to review the policy so that it not only contributes to the expansion of e-learning for employees in terms of quantity, but also contributes to the improvement of e-learning in terms of quality.

VI. Conclusion

Comparing two e-learning systems

In this study, we have attempted to compare the development and uptake of e-learning in two countries, Australia and Korea, by examining government policies and frameworks and the practical experiences of a set of representative education and training organisations offering e-learning, either as the major method of delivery or where it constitutes only a small part of programs offered. In doing so we have tried to identify the major strengths and weaknesses associated with this learning method and to provide some suggestions for improvement.

Similar ICT uptake

Australia and Korea are two countries which have quite different historical backgrounds and educational traditions. Although this diversity has in some ways been reflected in the ways that e-learning has developed in both countries, both have experienced a rapid expansion of opportunities for e-learning to occur in educational institutions and in business. For example, both countries are highly ranked against OECD comparator countries on many indicators of performance related to the uptake of ICTs (for example, computer usage and internet access). This means that both countries are well placed to take advantage of the benefits that e-learning provides. However, they begin from very different starting points.

Different starting points

Historically, Australia has had a tradition of opening up access to education and training (in elementary, secondary, and vocational and university sectors) to its citizens even if they live away from major

learning centres. To this end, institutions and educational systems have had in place formal arrangements for the delivery of distance or external education. This infrastructure has allowed the smooth introduction of e-learning approaches to enhance or to replace programs already being delivered. Thus, it can be said that for many educational institutions which were formerly enabling students to access courses via traditional distance methods, it has been a matter of substituting the traditional form of distance learning with methods based on interaction between student and teacher, and the organisation, via the internet. Nevertheless, institutions at all levels have embraced the new technologies to enable students to access resources, services or programs via the internet. In addition, with the increased use of computer-based administration of processes, and web-based intra and inter-organisational communication, the environment has also been created in industry for the application of e-learning strategies to company training.

By comparison, Korea has quite a different starting point for the development and implementation of e-learning. Distance learning in Korea has been offered by only a few educational institutions at each educational level, such as Air and Correspondence Middle School, Air and Correspondence High School, Air and Correspondence University in Korea. Korea has not as widely developed a distance learning system as Australia. Rather, the rapid development of ICT and its hardware infrastructure in Korea, along with its high literacy rate has largely contributed to development of e-learning in Korea.

Common pedagogical issues

While these two countries do not share similar starting points, we have also discovered by reviewing the literature and conducting the case studies that they share common issues with regard to the development and delivery of e-learning programs (see table 29). However, although some of the findings may only apply just to learning systems in Australia and Korea, there are implications for the implementation of e-learning for many countries.

Findings from the comparison

Findings from the case studies and reviews of existing research and national statistics provide for us a number of practical lessons. We take account of the drivers which have led to the uptake of e-learning strategies, and the strategies adopted by educational institutions, training providers, and enterprises to use the new technology to enhance learning experiences for students. We also consider the perceived benefits, and the issues and concerns that remain to be addressed. In the following sections, we summarise our main findings, and provide explanations on where e-learning in two countries converge and where they separate.

Government strategies and evolutionary forces drive e-learning

Government-funded initiatives have influenced and made possible the uptake of e-learning activities in education and training institutions, enterprises and the community in general. For both countries there has been a commitment to engage productively with innovation and the knowledge economy. This has meant an increased emphasis on taking advantage of the available technology (especially the internet) to place government communications and services online. In Australia e-learning has also evolved from traditional approaches to distance education in universities and vocational education and training.

Although the intent of the national frameworks implemented by Australia and Korea is similar in that they want to ensure that citizens have the tools and skills to operate in the new knowledge or information economy, the nature of the strategies that have been applied are different. These differences are due in part to differing legal and political traditions. Where legislation has been used to make government funding available in Australia for educational institutions and enterprises to engage with online technology and provide educational and business services online, there has been no attempt to legislate for the establishment of educational institutions solely devoted to providing online education, or for institutions to engage in e-learning provision. Rather it has been left to

educational institutions and state education and training systems to devise ways to make best use of the new technologies.

In addition, teachers within schools, universities and TAFEs have generally been free to adopt learning methodologies they believe to suit their particular subjects. This flexibility continues today. However, there are other types of incentives (including recognition awards, and access to special funding for the development of resources, purchase of equipment and materials and professional development) which encourage institutions and training enterprises and lecturers and trainers within these, to adopt innovative and flexible ways of teaching (including e-learning).

By contrast the Korean Government has adopted a more centralist and legalistic approach. It has legislated for the establishment of cyber universities via amendments to the *Lifelong Education Act*. The aim of these universities is to provide adult citizens with opportunities to obtain higher education degrees via e-learning. Such a strategy has also to be considered in light of the need to open up educational pathways to enable all citizens to have access to lifelong learning opportunities. Such a strategy is less critical in Australia where pathways between the sectors are more flexible.

The Korean Government has also introduced training incentives for companies who enable their employees to participate in what have been called internet Correspondence Training Courses. However, the red tape and effort associated with making applications for the incentives has led some companies forgoing the incentives. There have been no such incentives specifically directed at increasing e-learning participation for workers in Australian companies. Furthermore, legislation that has been aimed at increasing enterprise training (whatever methodology is used) has historically not been successful. However, the findings of the case studies indicate that the major drivers for the implementation of e-learning in enterprises is a wish to make convenient use of the technology to provide compliance training for existing workers in companies, and for learning company-specific product and service information.

Advances and affordability of new technology

It must also be acknowledged that in Australia and Korea advances in information and telecommunications technology which have provided quick access to information, resources and services, have by their very existence led to the expansion of internet usage for all types of activities, including education and training. We now use the internet to conduct many tasks or access services, which in the past were done either by postal mail, telephone or by face-to-face contact with government agencies or businesses.

The availability of the internet for interpersonal and interagency communication and downloading of information, has created an environment in Australia and Korea where online services signal a business's or educational institution's ability to keep up with new technology and with new ways of working or interacting. Increased access to the internet and affordability for Australian and Korean citizens (either at school, work, or at home) has in itself contributed to the expansion of the internet usage in the enhancement of the delivery of all services, including education and training in both countries.

Korea has a well-developed and successful electronics manufacturing industry, and a considerable domestic market in terms of its population. This also makes it possible for educational institutions, enterprises and the ordinary citizen to purchase the latest technology at reasonable prices. Although the cost of computers and software has also been gradually decreasing for Australians, they continue to represent a substantial outlay for the ordinary citizen and small enterprise.

Perceived cost-efficiencies

The uptake of e-learning in both institutions and enterprises has also been influenced by perceived cost-efficiencies. Although in some cases the availability of online facilities has indeed meant increased cost-efficiencies, there have also been hidden costs in terms of cost of course development, support for learners, and additional teacher time required to respond one-on-one to greater numbers of learners. For enterprises comprising workforces not located in one particular place (for example

companies such as QANTAS, insurance companies such as SUMSUNG, banks such as Banking Corporation), online learning represents a convenient way to provide training for workers without having to bring them into the company for face-to-face training.

There may indeed be cost-efficiencies in providing education and training online for enterprises and institutions with large populations; however, there are substantial upfront costs for the development and training of teachers, content developers and technicians. There are also heavy costs associated with the purchase of equipment and materials, the maintenance of technical systems and services, and the updating of web-based resources.

Most importantly, the major differences between the two countries is observed in the scale of operations. This means that, although it might make good financial sense for a large company like Samsung to adopt e-learning to train its considerable workforce, it may not be as critical for similar enterprises in Australia.

Concerns for access and equity

Another major driver of e-learning in Australia is the concern for access and equity (also a critical feature of the training reform agenda of the 1980s and 1990s). That is, it is felt that one way to enable all citizens to partake in learning (as and when required) is to provide opportunities for them to do so at their convenience. This means that they do not have to attend formal classes, and can learn in the comfort of their own home. However, this flexibility is accompanied by some other drawbacks. If students do not have the literacy, computer, and time management skills for independent learning, then this form of training may not deliver the anticipated benefit. In addition, if students do not have access to appropriate technology (are not on the internet at home, or do not have adequate access to the right computers and software), this will limit their access to training.

Although historically there has not been a major political concern for promoting access and equity in education and training, this situation is also reversing for Korea. Increasingly there has been a concern for

improving access to educational opportunities for those who have historically not been adequately served by the education and training systems. There has also been a wish to improve the flexibility of training by implementing e-learning methodologies.

Preference for a blended approach to learning

Although the online presence of public and private educational institutions in Australia is widespread, the availability and uptake of programs where there is no face-to-face interaction at some point during the program is low. However, the use of internet resources and communication channels to enhance traditional learning methods is common.

Findings from the case studies and reviews of existing research indicate that, apart from programs in cyber universities, there are few programs that use approaches where there is no face-to-face contact between students, and students and their teachers or facilitators. In the main, most courses in education and training institutions use blended delivery approaches. In addition, there were also courses or programs which have as yet to engage with e-learning. In such programs students undertaking face-to-face programs are able to access resources from a wide variety of internet sites. Students undertaking courses where the major part of the delivery is online are also able to attend face-to-face workshops or sessions to clarify questions, and to reduce the sense of isolation sometimes felt by students who are learning independently and away from other students.

Findings from student evaluations of training delivery also indicate that students prefer to have some face-to-face contact with their peers and their teachers, tutors or trainers. That said, it is also true that the establishment of group networks for students can facilitate inter-student communication via email.

Transparent learner management systems

As institutions move to customer-focused learning, be it through e-learning technologies, or self-paced learning methodologies, there is a

need to develop effective tracking systems for individual learners to ensure that components of the system are transparent and can be readily understood by students and their employers. This need arises as it becomes increasingly more difficult to track individual student progress, monitor staff work schedules, identify fees for students, and develop individualised training timetables and plans.

It is also clear that educational institutions are taking advantage of internet facilities to get an online presence, and to conduct important administrative and monitoring tasks online. This includes marketing their institution, and providing an interactive environment for students to find out about the courses they want to study, and the people they will need to contact. It also allows institutions to place their policies and procedures concerning credit transfer and articulation on the net. This enables students to make informed decisions about the courses they want to study without having to physically visit each institution.

Once students have enrolled in any course, whether it be face-to-face or online, they can also use the internet to monitor and track their own progress. For their part, institutions can also use online learner management systems to track the progress of students through courses, and to monitor and access results of courses.

The expansion of e-learning

It was true for both countries and for all the cases reviewed in each country, that e-learning is gradually expanding as a means of education and training. Although also true for educational institutions such as universities and VET institutions in Australia, this expansion is not even across courses and specialisations and there continue to be certain fields where the use of e-learning is far less common or non-existent. Although e-learning has been blended with traditional face-to-face methods in many programs across different institutions, the majority of programs still rely on face-to-face arrangements. In Korea the establishment of universities delivering 100% of their courses online by a special law enacted by the Korean Government also shows the increasing importance of e-learning for obtaining higher education degrees. Korea. The cyber university concept has not been

adopted in Australia, although existing universities can choose to place courses online. However, there is nothing to stop individuals from accessing programs from online overseas universities via the internet.

 However, in both countries, the most rapid development and uptake of e-learning is occurring in companies for the training of their employees. Firms, recognising the cost-efficiency of e-learning, are increasingly adopting e-learning as the leading method for delivering training. They are motivated by the high flexibility and accessibility of e-learning which makes it possible for learners to engage in learning at any time and anywhere. Thus, companies can provide training to employees without taking them away from work at a designated time. It should come as no surprise that profit-seeking organisations, such as firms, have been the first to recognise and take advantage of the benefits of e-learning.

Difficulties in developing e-learning content

While both countries share common issues and problems associated with the development and implementation of e-learning, some issues are more significant for one country than the other. Often, this is caused by factors external to e-learning.

For instance, the development of e-learning content for Korean firms is a critical issue. The limited availability of e-learning specialists in Korea, makes it very difficult for firms to obtain the expertise they require to develop good e-learning materials for specific programs. Often, they purchase e-learning content which has already been developed by private training organisations specialising in e-learning. However, large companies with private learning centres try to develop their own e-learning materials according to company training needs. However, this is not an easy or inexpensive task because it takes a lot of time, people, and money to develop good e-learning contents. Once developed, such materials can be only used for limited time and purpose, and this also intensifies the cost. For most companies in Korea, e-learning content development is a burdensome issue.

Although Australian companies must also deal with issues related to cost and effort if they are to develop their own learning materials, they are able to purchase learning content from other English speaking countries. Unless the purchased content is not in English, this means that they will not have the added expense or difficulties associated with translation of learning materials into the domestic language. For instance, Bank SA, one of the Australian case studies organisations, used many e-learning packages developed by IBM and other commercial consultants. The fact that e-learning organisations in Korea have to rely on domestic sources to obtain e-learning materials, because the materials must be written in Korean, works as a major obstacle to the effective development and implementation of e-learning.

Copyright issues and concerns

As more and more materials are placed on the web, there are worldwide concerns about copyright. This is also true for Australia. Copyright issues will also escalate as more and more people participate in e-learning, and the materials and information available online can be easily shared by an undesignated number of people. In Korea, the copyright issue, although important, has taken backstage position to other issues associated with e-learning. In addition, e-learning materials on the internet are not yet as widely shared as in Australia. However, if Korea is also to deal with the issue of copyright, then it may have to apply significant effort to establishing copyright policies and developing strategies for enforcing these. However, this will not automatically lead to significant decreases in copyright breaches. This has also been the experience in Australia.

Practical realities

The findings of the case studies have described how e-learning has been applied in educational institutions and enterprise training organisations in Australia and Korea. They have also enabled us to understand more clearly the types of drivers that have influenced the uptake of e-learning at the organisational level, and to appreciate the benefits and the problems experienced by practitioners. In table 29 we provide a

diagrammatic summary of the shared and disparate experience of Korean and Australian organisations.

Table 29: Matrix for identifying case study findings

	Australia			Korea		
	university	enterprises	TAFE	university	enterprise	TAFE (N/A)
Drivers of e-learning						
Government initiatives	X	X	X	X	X	
Compliance requirements		X			X	
Increasing market share	X		X		X	
Keeping up with technology and engaging with innovation	X	X	X	X	X	
Achieving cost-efficiencies	X	X	X		X	
Enhancing traditional methodologies	X	X	X	X	X	
Increasing flexibility	X	X	X	X	X	
Evolution from distance learning programs	X		X			
Strengths						
Flexibility	X	X	X	X	X	
Additional resources to enhance traditional programs	X	X	X	X		
Suits independent learners	X	X	X	X		
Opens access to training for those who cannot attend physical classes	X		X	X	X	
Weaknesses						
Identifying accurate workload of teachers	X		X	X	X	
Lack of personal interaction with other students	X		X	X	X	
Slow infrastructure in regional areas	X		X			
Requires time to develop courses	X	X	X	X	X	
Cost of developing courses	X	X	X	X	X	

It is clear from table 29 that, at the grass roots level, the practical experience of educational and enterprise training organisations in implementing e-learning is generally similar across the two countries. However, it is interesting to note that the quest for market share does not appear to be as important in cyber universities in Korea as it does for universities and TAFE institutes in Australia. In addition, it is telling that issues connected to inadequate infrastructure is not a major area of concern for Korean organisations, partly because of the smaller geographical distances between learning centres and clients, and partly because of more advanced equipment to enable speedy internet connections.

We have already noted that distance learning traditions have also led to the uptake of e-learning arrangements in Australian universities and specific TAFE institutions. Although there has also been a tradition of correspondence schools and programs in Korea, they have not played a major role in the implementation of e-learning. This has been played by the cyber universities and by enterprises.

Industrial relations issues connected to an accurate appraisal of teacher or trainer workloads seem also to be a shared problem for Korean and Australian educational institutions. However, where this is identified for Korean training organisations, it is not a major concern for training departments in Australian enterprises.

That e-learning suits those students who are self-starters and motivated to undertake learning has also been a common experience for organisations in both countries. If students do not have a high commitment to their studies, or let other social and family commitments interrupt their time for learning, then e-learning, which is highly dependent on students being able to manage their time, may not be the best solution for them. Furthermore, if they do not have appropriate literacy and numeracy skills to engage effectively with the new learning environment, they will also experience problems.

The way forward

Regardless of whether online learning does or does not provide better outcomes than traditional learning, it is here to stay. It provides an alternative route to qualifications for those who are unable to attend regular classrooms. It also enhances traditional delivery in programs that blend new technologies with traditional face-to-face teaching. The challenge is to make sure that each of the delivery methods makes good use of ICTs to improve effectiveness, and that a sensible blending of the two technologies occurs as subject matter becomes more complex. However, it is clear that e-learning requires teachers and students to be adequately skilled and motivated to use the new technologies. It also requires institutions to recognise the different patterns of working for teachers, and consider these in decisions about contact hours, remuneration and working conditions.

There is opportunity for both Australia and Korea to become leaders in the application and use of new technologies. Both countries have high-speed internet access, ministerial and financial backing, innovative hardware and software, and provide opportunities for the professional development of teachers in the digital medium. As the internet makes it possible to transform a subject or course for widespread distribution or sale, this can open up new markets.

However, it is also clear that, despite the benefits that organisations and individuals derive from using the internet for accessing government and business services, and information to be used for learning, it cannot be expected to meet the needs of all learners. We have found that, in some cases and for some individuals, it can successfully replace traditional methods of face-to-face delivery. In most cases it needs to be combined with face-to-face training and support to ensure that learning is effective, and that learners do not feel isolated from teachers and from peers. The evidence is also mixed about whether it provides less costly training and whether it leads to better academic achievement than traditional forms of learning. Nevertheless, both e-learning and traditional learning approaches can and will continue to exist side by side as viable learning approaches. The real challenge is to ensure that each can enhance the other to provide learning for individuals that meets their needs.

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Appendices

Appendix A: Focus of case studies and interview schedule

Major focus areas for case studies

The case studies will collect information on the arrangements in place for:

- Preparing for delivery (arrangements for the development of resources, expertise and materials)

- Delivering the training

- Assessing the training

- Providing feedback to students

- Maintaining the records

- Assuring the quality of training

- Dealing with human resources and industrial relations issues

- Meeting the costs

- Providing access and equity

- Identifying the strengths and weaknesses

- Improving arrangements

Informants

Teachers/lecturers/professors

Students (Australia)

Training managers, administrative staff

Collecting original data for case studies

Semi-structured interviews (in-person, telephone, focus groups of students if possible)

Teacher – interview schedules

1. Descriptive information

Subject taught ………………………………………

Qualification level …………………………………………

No. of students ………………………………………

Delivery method …………………………………………

(e.g. campus-based, distance, internet-based, video-conferencing, combination …………)

Student outcomes …………………… (% who complete, drop-out etc)

2. Preparing for e-learning

How did you go about preparing for the delivery of this program?

- Developing teacher expertise

- Purchasing or developing quality learning materials (content, appearance etc.)

- information technology infrastructure issues

3. Delivering the training

What are the main training methodologies that are used to deliver the program?

- Enrolment
- Delivery of training
- Assignments and assessments
- Learning materials
- Monitoring and feedback (how and when)

4. Meeting the costs of training

What are the costs that need to be accounted for?

- Costs to students
- Costs to teachers/lecturers/professors
- Costs to system
- Costs to the institution

5. Providing access and equity

What strategies (if any) do you have in place to ensure equitable access to training?

- Learning support programs
- Access to equipment and learning resources

6. Dealing with human resources and industrial relations issues

What are the key human resources or industrial relations issues that have had to be addressed?

- Teacher hours

- Recognition of different ways of working

- Teacher salaries

- Identifying new skill sets

7. Identifying the strengths

What are the benefits (strengths) of this type of delivery?

- For students

- For teachers/lecturers/professors

- For the system

- For the institution

8. Identifying the weaknesses

What are the problems associated with this type of delivery?

- For students

- For teachers/lecturers/professors

- For the system

- For the institution

9. Key features of success

What are the key strategies that you have employed that have been successful?

10. Continuing challenges

What are the areas that continue to be problematic?

11. Suggestions for improvement

What are the three main strategies you would implement to improve the success of your program?

Appendix B: Strategies for increasing Australia's competitiveness in the information age

Table B1: Summary of strategies for improving Australian competitiveness in the information age

1.	**Awareness-raising initiatives**	
	Online Australia Day 1998, 1999	Activities to promote benefits of online technology
	New connections web-site	Regional telecommunications portal for information on local projects, funding, and consumer information
	Netspots	Online directory of public internet access facilities (public libraries, internet cafes available on free call number)
	Save@home study	Showing how Australians can derive financial and lifestyle benefits from internet use
	Tech Trek	Regional demonstration of benefits of information technology
2.	**ICT for stronger families and communities**	
	Community portal	Information on internet tools and services to help community organisations get online and become effective ICT user
	Family and Community Network Initiative	Improving community capacity through improved ICT facilities and training
	Prime Minister's Business–Community Partnership	Encouraging collaboration between the community and business sectors (e.g. CISCO System and Smith Family joining to provide training for under-privileged youth)
3.	**Increasing awareness and access for Indigenous Communities**	
	Community phone program	Funding to provide and access telephone services in remote communities
	Online Access Centre Business Study	Study to examine establishment of hub service for internet and video conferencing activities, coordinate state and territory government activity

	Internet Access Program	Provide internet access to communities outside the hub by subsidising satellite dish, software and hardware and initial support and training
	Content Development Program	Funding to develop appropriate content for Indigenous communities
	Information and Awareness Raising Program	Improve awareness of internet services and telecommunications among Indigenous communities
4.	**Increasing access for underprivileged groups**	
	Accessibility Program	To help the aged and people with disabilities gain access to online information and communication services
5	Accessible E-commerce Forum	Forum to discuss activities that can be undertaken to ensure positive outcomes for the aged and those with disabilities
	Online Public Access Initiative	Improve public access to online technologies (regional and rural access, access for people with from equity groups: people with disabilities, non-English speaking background, Indigenous Australians, unemployed, the aged, women and parents supervising internet access)
6	**Adoption of standards and guidelines**	
	Adoption of World-wide Web Consortium and Web Content Accessibility Guidelines	Adopted these standards for all government websites

Appendix C: Strategies for implementing ICT education policy

Table C1: Strategies to implement the learning for the knowledge-based society: An education and training plan for the information economy

		Enabling people to develop appropriate ICT skills
	Quality teacher program, science lectureship initiative, increase in funded university places IT skills hub	$ 77.7 million for 2000–03 to renew teacher skills in quality teacher program, science lectureship initiative provides $25 million in 1999–2002 to provide future skills required the online economy; 34.8 million over 4 years to increase regional places; IT skills hub to improve information on IT skills demand and provide uptake of training and careers in IT
	Australian Flexible Learning Framework	National staff development activities in the VET sector to help practitioners develop ICT skills to apply online learning technologies
	IT skills for older workers (45 years and above)	$500 per participant, 23 million over 4 years
	Innovation New Apprentice Scheme	$11 000 to employers if they take on apprentice in IT
	Oze-culture	Training for cultural organisations in e-business
14b	**Infrastructure**	Innovative bandwidth arrangements for the Australian education and training sector explores approaches to meeting requirements for high speed online communications
	Computer technologies for schools	Government provides surplus government computer and IT equipment to schools
	Capital development pool	Innovative electronic infrastructure projects in universities. $120 million

	National Communications Fund	$50 million to enable high-speed telecommunication networks for education and health services in regional Australia
	Advanced Networks Program	$40 million of grants for advanced networks and test-based projects
	Australian Academic and Research Network	Innovative approach to meeting increasing bandwidth requirements
	Systematic infrastructure initiative	$246 million over 5 years for upgrading basic infrastructure to universities
14c.	**Online content, applications and services**	Online educational content
	Education portal, <http://www.education.gov.au>	This is the online entry point to range of information and services about education in Australia
	Education portal, <http://www.education.edu.au>	Portal to resources and services for all education sectors
	Common technical standards	AICTEC has established a standards sub-committee to address this issue
	Collaborative online learning services (COLIS)	Piloting of test bed by five universities working together
	Australian Flexible Framework Toolboxes	<http://www.flexiblelearning.net.au/toolbox> provides teaching and learning strategies which can be modified by teachers in their training delivery
	The Le@rning Federation	Produces national pool of high-quality online curriculum content for Australian schools, promotes Australia's cultural identity, and innovative skills in young Australians
	Virtual Colombo Plan	To strengthen basic and higher education in developing countries through use of ICTs, by providing distance education scholarships, assisting developing countries to use ICTs in distance education

		programs
14d.	**Policy and organisational framework**	Ministerial Council for Education, Employment, Training and Youth Affairs, MCEETYA Shared national vision across education and training sector,
	MCEETYA Taskforces	Australian ICT in Education Committee (AICTEC), promotes cooperation between the sectors ICT in Schools Taskforce (ICTST) advisory group on use of ICTs in school education and development of national services
	International comparisons of ICT policies project	Benchmarks Australian performance against comparator countries
14e	**Regulatory framework**	
	Digital agenda amendments	Exceptions to copyright for educational and research purposes
	AEShareNet	Online copyright management system for VET sector
15.	**Skills initiatives**	
	Backing Australia's ability'	$151 million for five years to fund additional 2000 university places
	Loans for students	Establishing income-contingent loan scheme for post-graduates paying fees
	Scholarships	25 Federation Fellowships to attract and retain leading researchers in key positions
	Fostering technology, science, and innovation	Funds to government schools to foster scientific, mathematical and technological skills and school innovation
	Migration arrangements	Changing arrangements to attract more migrants with ICT skills
	SmartMoves	Increasing awareness of importance of science and technology in young people
	Improving university infrastructure	Improving university ability to provide overhead resources for undertaking high-quality research and training programs and projects

16.	**ICT Centre of Excellence**	Funding to establish ICT Centre of Excellence to provide post-graduate research and training in the ICT area
17.	**Coordination and collaboration**	National Office for Information Economy convenes working groups and associations (IT Skills Hub, Industry Training Advisory Board, the Australian Information Industries Association [AIIA] and the Australian Computer Society). It promotes awareness of ICT literacy for wider community, and works with industry bodies to coordinate activities on ICT skills and education issues.
	Commonwealth ICT skills working group	Comprising representatives from Department of Education, Science and Technology, Department of Employment and Workplace Relations, Department of Immigration, Multicultural and Indigenous Affairs, and Department of Industry, Tourism and Resources Monitor trends to ensure adequate supply of ICT skills and highly qualified ICT professionals, assessing impact of government policy and programs, sharing information on ICT skills initiatives and cooperating on joint projects (for example, promotion of IT careers to school students)

Appendix D: Brief descriptions of case studies from prior research

E-learning for the blind or vision-impaired

The Royal Victorian Institute for the Blind has examined the use of TruVision (a resource developed as part of an access and equity project commissioned by the Australian National Training Authority in 2001). TruVision is a learning system that has been designed to offer on- and offline options to students who are blind or visually impaired and are interested in gaining work in the information technology industry. It provides students with opportunities to gain qualifications or further training.

Students can access six units of competency from the Information Technology Training Package. These deal with operating a personal computer, word processing application, spreadsheet application, database application, presentation package, and using internet browsers and email to retrieve and send information.

The online program enables students to acquire workplace competencies as employees of a simulated information technology company (TruVision). They are given a variety of realistic practical tasks and assignments. Support is provided by virtual information technology support officers, and a learning facilitator and other students.

The findings showed that the difficulties experienced by blind or vision-impaired students were similar, but more pronounced, to those experienced by their sighted counterparts. For example, students who did not have a strong need to learn certain aspects of the course were more likely to withdraw from the course, as were those who had limited prior understanding of what flexible learning entailed. In addition, those with internet connections that were slow and ineffective, due to limited internet bandwidth, experienced particular frustrations. Delayed connections often meant that audio files (which were essential in the

majority of cases) were not readily available for the learner to move on to understand what was required.

It was also important for learners to have access to facilitators, either via email, discussion board postings and internet chatrooms. A technology help desk (email or telephone) was also found to be especially helpful to learners who are new to computers and to their adaptive technology. It was also felt that face-to-face facilitation prior to moving to a distance learning methodology was also worth pursuing.

Successful outcomes were also more likely for students with a strong motivation to learn (often for employment-related objectives) and fundamental technology skills. It was essential for learners to have good skills in basic computer operations, using the internet, and facility with adaptive technologies that have applications for blind and vision-impaired learners.

The EdTrak individual learner management system

The social sciences department of the East Gippsland Institute of TAFE has developed an individual learner management system. The EdTrak system records and prints individual learning plans that have been signed off by the provider, the student and the employer. It calculates fees according to mode of learning. It creates assessments for individual units of competence from training packages, tracks student progress and records the amount of time allocated to workplace study. The system records learning timeframes, contacts between learning managers and learners, and communications with employers. It also tracks the workload of the learning manager.

The Youth Gateway at Box Hill

The Youth Gateway is a joint project developed between Box Hill Institute of TAFE and Box Hill Senior Secondary College in the state of Victoria. It provides access to online resources for a wide variety of units

or modules from a number of training packages. These are aimed at helping young people improve their literacy and numeracy, and the skills and knowledge for managing everyday situations. The resources also include modules on operating computers and various word processing and spreadsheet operations. Also available are units on writing and comprehending information, using the internet, performing arithmetic calculations, maintaining and servicing motor vehicles, and understanding procedures for workplace occupational health and safety (OH&S), including the prevention of injuries and OH&S legislation. There are also modules that help teachers to prepare, facilitate and customise online courses and assessment tools, and manage communication hubs. In addition, teachers may access the whole Certificate IV Assessment and Workplace Training course from the Youth Gateway.

Introducing online teaching and learning at William Angliss Institute of TAFE

The institute aims to encourage teachers to adopt online teaching and learning using a staged approach to learning and development. From the outset it was important to ensure that staff had confidence in the team (Angliss Online) which was to help implement online teaching and learning methodologies at the institute. This meant that the information, support and resources provided for program managers was reliable and user-friendly. The technology needed to work, and the trainer who was to introduce it to teachers had to be skilful in presenting information in a non-threatening manner. The approach comprised the following six stages.

Stage 1 involves them in developing basic skills such as creating and storing electronic lesson notes, making power point presentations, using email to communicate with their peers and their students. In addition, teachers are taught to make holiday bookings online, and to test Toolbox resources. This is aimed at helping them to be comfortable with the electronic medium, and also to develop their ability to be critical about the effectiveness of certain online resources. In Stage 2 teachers place

their course outlines and lesson notes online for off-campus students. Then they move to introduce graphic applications and special quiz tools. Stage 3 helps teachers to use the 'Administrator Creation' program where shift their word programs to a master program. Here they are able to develop quizzes, and include digital photographs. Stage 4 introduces teachers to the Dreamweaver Course Builder for the development of materials. Stage 5 encourages teachers to use enhancements to what is already available on the virtual campus and especially assessment drop boxes. In Stage 6 courses are placed online with the virtual campus.

Appendix E: Uptake of ICT

The PISA Survey

The survey also included a questionnaire on the use of information technology. An analysis of the findings by the Australian Council for Education Research (2000) indicates that nearly 85% of the 5000 Australian students responding to the survey had home access to computers nearly every day. This was the highest among all comparator countries. The average for this group was 63%. When students were asked how often they used computers at home, 43% of Australian students compared with the OECD average of 38%, used a computer almost every day. In addition, those students who used a computer almost every day had higher reading literacy assessment scores (539 for Australian students versus 519 for the OECD average). Australian students also scored higher than their OECD counterparts on items that seek to find out about their comfort, motivation, enjoyment and ability to use computers. Furthermore, computer availability at school for Australian students (52%) twice that for the OECD average (26%). Australian students also had more frequent usage of computers at school than their OECD counterparts. Mean literacy rates for Australian students who used a computer nearly every day were also higher than their OECD peers (533 versus 496 respectively).

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