2008 e-Learning in

Taiw@n

The Vision and Achievements

Abstract

Thanks to the invention of broadband networking, e-Learning is a cross-industry education and training revolution. In the past few years, countries around the world have posited e-Learning as a major strategy for enhancing national competitiveness, and governments have thus become the hand that rocks the cradle.

With the support of government policies, preliminary achievements of the National Science and Technology Program for e-Learning (2003-2007) promoted by the National Science Council (NSC) have been seen through the concerted efforts of industry, government, academia and research institutions in the areas of e-Learning for all citizens, bridging the digital divide between urban and rural areas, transferring academic research results to industries, and establishing Taiwan's e-Learning industry.

In order to expand the influence of e-Learning, the NSC integrated the program to the National Digital Archives Program to form the Taiwan e-Learning and Digital Archive Project (TELDAP, 2008-2012). The aim is to promote the comprehensive Taiwanese culture to the world and transform Taiwan into the center for global promotion of Chinese culture by closely integrating digital archives to e-Learning, by making full use of government, academic and civilian resources, and by utilizing the ubiquitous nature of e-Learning technology.

This "*2008 e-Learning in Taiwan–The Vision and Achievements*" includes the achievements of Phase I and the prospects and visions for Phase II, and provides an important reference for organizations at home and abroad to understand e-Learning development in Taiwan. In addition to making e-Learning key to enhancing Taiwan's international competitiveness, we hope that this program may inject new drive for industrial upgrade and innovation, and thereby assist industries to enter the international stage with the concept of "Digital archives as the base, e-Learning as the function" on exalting Taiwan's cultural uniqueness.

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Part 1 Taiwan's e-Learning Vision and Strategy

Part 2 Accomplishments of the e-Learning National Program (2003-2007)





職涯學院


Part 1

Taiwan's e-Learning Vision and Strategy

2008 e-Learning in Taiw@n

The Vision and Achievements

Chapter 1
e-Learning Program Vision and Strategy Overview

To enhance national competitiveness, promote industrial development, and improve social benefits, Phase I of the National Science and Technology Program for e-Learning was implemented during 2003-2007. The National Science and Technology Program for e-Learning was combined with the National Digital Archive Program in 2008 to promote the development and maximize the benefits of archival digital contents and satisfy the demands of e-Learning courseware in the Taiwan e-Learning & Digital Archives Program (TELDAP), a five-year program starting from 2008.

The aim of the TELDAP is to creatively promote the application of the national digital archives and e-Learning; to promote cultural, social, industrial, and economic development in Taiwan; and thereby to promote the Taiwan experience to the international society for expanding the international space of Taiwan, for sustaining the operations of Taiwan's important cultural assets, and for developing the e-Learning industry and e-Learning application in education. The vision for e-Learning includes the cultivation of the e-Learning industry, secure the e-Learning application to formal and lifelong education, as well as the promotion of e-Learning for the Chinese language to the world.

The TELDAP is planned according to platform, content and technology R&D, while being expanded to application through academic and social application promotion, industrial development and promotion, formal education and lifelong learning, as well as language e-Learning, overseas promotion and international cooperation, in order to promote the entire program by means of integration and division of labor.

Nonetheless, this book focuses on the four e-Learning-related projects, namely; Digital Education and e-Learning, e-Learning Industry Promotion and Development Plan, Research and Development of Basic Theories and Prospective Technologies, and e-Learning for Language Project. Each of these projects is introduced in the following chapters.

Chapter 2
Digital Education and e-Learning

The demonstration model for promoting digital education, and the learning resources and achievements for primary and second schools have been established during Phase I of the National Science and Technology Program for e-Learning. These have provided citizens with multiple, effective, and convenient access to methods for enriching knowledge and improving skills, and have brought essential benefits for enhancing the quality of Taiwan's human resources.

For higher education, the Ministry of Education (MOE) has promoted e-Learning courseware and course certification, trialed e-Learning master's programs, demo courses and cultivated e-Learning professionals. In 2006, the MOE announced the Implementation Regulations Regarding Distance Learning by Universities to loosen the total number of e-Learning credits to half of the credits required for graduation, and to allow particular college and university departments to trial master's programs using e-Learning. For primary and secondary education, the MOE has emphasized on the application of e-Learning. Additionally, the MOE has offered online continuing education programs and shared resources on teaching with e-Learning for in-service teachers working on offshore islands and in remote areas.

Continuing the achievements in Phase I, the successful experience and models established in Phase I will be expanded and deepened to formal education and lifelong learning in Phase II in order to enhance the learning efficacy on all citizens. In promoting teaching with e-Learning for primary and secondary schools, resource integration will be reinforced, innovative teaching models will be implemented, and digital resource divide will be bridged; and resources will be linked to the teaching of teachers in local counties and cities. In promoting e-Learning for colleges and universities, a human resource support mechanism assisting teachers to apply e-Learning in teaching and a guidance mechanism for the quality of implementing e-Learning will be established, and the amount of quality e-Learning courses and personnel with international competitiveness will be increased.

In promoting lifelong learning, the Council of Labor Affairs (CLA) provides labors with a wide range of e-Learning resources, such as “e-Learning Website of Labor” (http://cla.hilearning.hinet.net), Labor Education Area, eTest Net (www.etest.org.tw) and other e-Learning websites, to help them improving work skills and knowledge in occupational safety in order to improve their work skills and increase their chances of employment. Additionally, courses concerning occupational safety, rights and benefits are provided to reduce work-related injuries and work- or home-related accidents. The Council for Cultural Affairs (CCA) has established various e-Learning schools to bring a new vision in art and cultural learning with comprehensive professional and delicate e-Learning courses. The Central Personnel Administration (CPA), on the other hand, has created ubiquitous e-Learning environments and mechanisms for public sectors in order to foster human resources for public sectors, to stimulate the learning motivation of civil servants, and to enhance the quality and efficiency of services.

Section one of this chapter introduces the visions, goals, and promotional strategies of digital education and e-Learning for the public. Sections two to five state the strategies and action plans for promoting e-Learning in formal education, for civil servants, labors, and art and culture respectively. Section 2.6 sums up this chapter

2.1 Visions, Goals and Promotional Strategies

I. Visions and Goals

The visions and goals of digital education and e-Learning in formal education and lifelong learning promoted by the MOE, CPA, CLA and CCA include: to enhance the efficiency of educational systems; to enhance utilization rate of e-Learning in public sectors; to improve labor quality through use of learning resources; and to create an integrated learning environment for art and culture.

The goals to be promoted and achieved for such visions are tabulated Table 2-1-1 .

II. Promotional Strategies

(I) Formal Education

Four promotional strategies have been established to facilitate teachers of all levels, including primary, secondary, vocational, and higher education, to make full use of emerging technologies and e-Learning. These include fostering of e-Learning professionals; developing e-Learning courses for colleges and universities; promoting the implementation of e-Learning for secondary and vocational education; and integrating digital archive to primary education.

(II) Lifelong Learning

In addition to formal education, ministries should aggressively promote e-Learning to lifelong learning activities for adults, particularly in the utilization of resources of public sectors, in order to foster talents for promoting e-Learning in a multidimensional manner, to enhance the quality of e-Learning courseware, to create a quality learning environment for civil servants, and to establish labor e-universities for enhancing the digital capability of labors by integrating e-Learning resources.

These also include the application of e-Learning in cultural promotions. For example, teaching resources are provided and teachers for art and cultural fields are trained based on the ideal and goals of the Art and Cultural Studies in the Grade 1-9 Curriculum in order to provide students with cultural and art education right from the beginning. Furthermore, under the policy of knowledge and resource integration for culture and art, the professional image of culture and art is shaped through media, the Internet, public

relations, and publicity materials in order to encourage the public to use services and resources on related websites more frequently and deeply.

Table 2-1-1 Visions and Goals of Promoting Digital Education and e-Learning

Item	Vision	Goal
Formal Education	To enhance the efficiency of educational systems, to promote even distribution of learning resources, to promote the teaching innovation and development, and to provide multiple learning channels with e-Learning	1. To enhance the e-Learning competence of educational personnel and to enhance the ICT application literacy of teachers and students with e-Learning. 2. To enhance and promote the efficacy, innovation and development of education systems with e-Learning. 3. To create an environment for sharing resources and to promote the even distribution of learning resources with e-Learning.
Lifelong Learning	To create ubiquitous environments and mechanisms for public sectors, to stimulate the learning motivation of civil servants, and to enhance the quality and efficiency of services with e-Learning.	1. To create an on-demand e-Learning environment; to provide convenient and friendly learning channels; and to reduce the marketing and training time and cost of government policies. 2. To establish an e-Learning culture for enhancing the capability and willingness to use e-Learning of civil servants; and to gradually increase the percentage of e-Learning application to 20% of the total learning hours a year.
	To improve labors' digital capability and capability of utilizing web resources for lifelong learning in order to enhance the general quality of labors and thereby to boost industrial development.	1. To create an e-Learning environment for labor education; to improve the computer skills of labors; to spread new knowledge and information relating to labor affairs; to help labors to understand their rights and benefits; and to improve their work skills. 2. To implement the e-Learning and e-testing mechanism; and to provide one-stop full-featured quick testing and certification service.
	To create an integrated learning environment for art and culture; to create an e-cultural society; to enhance the general cultural and art creativity and competitiveness of the country.	1. To integrate cultural and art resources to cultivate an e-society for cultural content and digital technology development. 2. To transform Taiwan into a hotbed for ICT application and an e-Learning industry powerful country with cultural literacy. 3. To promote Taiwan into a world-leading country in e-Learning technologies for culture and art.

2.2 e-Learning Action Plans for Formal Education

I. Action Plans

The MOE has established individual actions plans to promote e-Learning to formal education of all levels based on the following four aspects: e-Learning professionals, e-Learning for colleges and universities, e-Learning for vocational education, and teaching with e-Learning for primary and secondary education.

- To foster e-Learning Professionals: To equip train teachers of all levels to add e-Learning courseware to teaching resources and to equip them with the capability of integrating digital archive to courses.
- To combine general education courses of colleges and universities to organize e-Learning demo courses.
- To research and develop vocational e-Learning coursewares for sharing with all teachers through creative commons (CC) licensing.
- To establish digital content instructional resource networks for primary and second school teachers form teams to integrate e-Learning in teaching and to organize teaching agenda and materials design contests and teaching demonstration lectures in order to promote quality e-Learning implementation cases.

II. Projected Benefits

To achieve the goal of normal application of e-Learning to formal education of all levels, the projected indicators for 2008-12 are tabulated Table 2-2-1 .

Table 2-2-1 Cross-reference Table for e-Learning Development Indicators in Formal Education

Indicator	2008	2009	2010	2011	2012
Foster e-Learning Professionals	65%	70%	75%	80%	85%
Develop e-Learning Materials for Senior High Schools and Vocational Schools	5 fields/subjects 600 units	5 fields/subjects 600 units	7 fields/subjects 600 units	3 fields/subjects 600 units	3 fields/subjects 600 units
The Percentage of Teachers Using ICT in Teaching	40%	50%	70%	90%	95%
The Percentage of Schools Implement the ICT Application Test of Students	10%	20%	30%	40%	45%

2.3 Promoting e-Learning for Civil Servants

The Central Personnel Administration (CPA), Executive Yuan, participated in the Taiwan e-Learning and Digital Achieves Program (TELDAP) in 2008 and implemented the Public Functionary e-Learning Plan (Plan), a plan in the Digital Education and e-Learning Project which is a subproject of TELDAP, to create quality, ubiquitous e-Learning environments and mechanisms where civil servants can make full use of information technology; to stimulate the learning motivation of civil servants; and to enhance the quality and efficiency of services.

The promotional strategies and action plans of this Plan are as follows:

I. Promotional Strategies

These include the establishment of a mechanism for circulating and exchange information among government agencies, and the development of a learner-focus shared public department e-Learning platform in order to save government training resources and to enhance training efficiency.

To foster talents for promoting e-Learning in a multidimensional manner in public sectors, and to promote international e-Learning talent cultivation and exchange in public sectors in order to broaden international view and to enhance the competitiveness of government functionaries. To combine the certification system to enhance e-Learning courseware's quality make e-Learning a strategic tool for human resource development in order to enhance the decision-making quality and administration efficiency of the government.

II. Action Plans

A cross-platform information transmission and integration mechanism is established (Figure 2-3-1) on a portal which links to various external learning platforms, and public sectors are coordinated to log in the CPA Personnel Service Web via the e-Learning websites of public sectors in order to let civil servants to access to the learning resources on different sites easily for achieving the goal of "building characteristics, professional division of labor, and resource sharing".

Furthermore, courses for fostering e-Learning talent of different levels are opened based on the nature and needs of departments and seed-teachers are trained in order to guide and promote e-Learning

respective departments after they complete the courses.

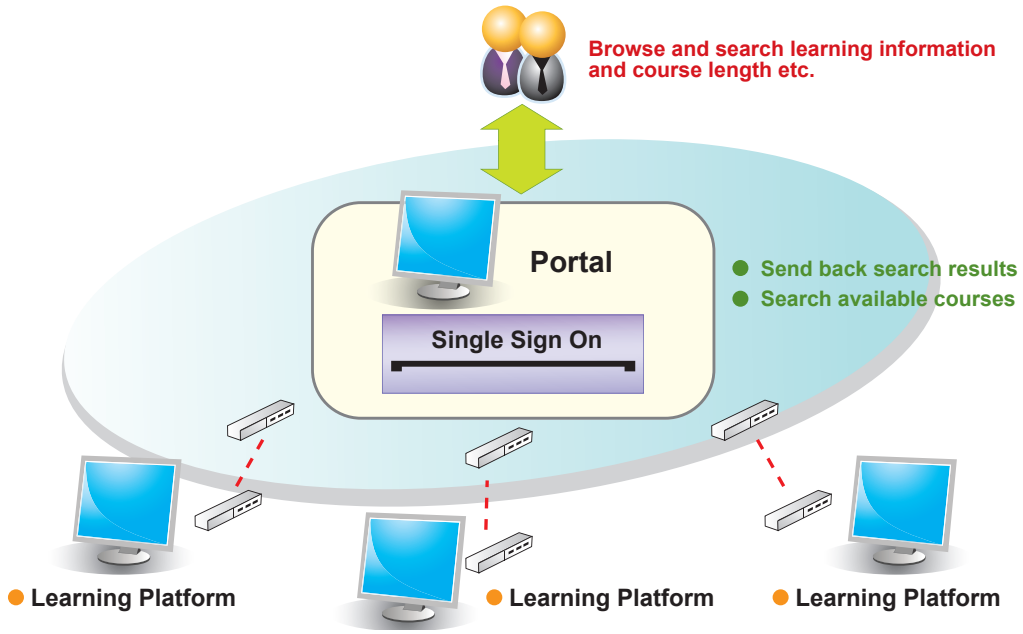
Last, benchmarking learning and promotional activities are organized to enforce e-Learning actions by producing e-Learning promotional courseware, by setting minimum course length, by organizing demonstration activities, and holding regular e-Learning publicity activities.

III. Projected Benefits

The CPA promotes the e-Learning for civil servants aggressively in order to integrate the e-Learning resources of public sectors, to stimulate the learning motivation of civil servants, and to enhance the quality and efficiency of services.

More importantly, e-Learning can enhance government efficiency and is expected to effectively save training cost and time of public sectors by integrating the learning resources of public sectors, enhance the efficacy of lifelong learning of civil servants, to foster the most middle-level civil servants with the least time and cost, and to enhance the general international competitiveness of Taiwan's civil servants.

Figure 2-3-1 Illustration of Information Transmission Synchronization



Source: CPA

2.4 Promoting e-Learning for Labors

The Council of Labor Affairs (CLA) participated in the National Science and Technology Program for e-Learning and proposed the e-Learning Program for Workers (e-LPW) according to the administration plan and with the budget of the council during 2003-2007 to cope with the Challenge 2008: National Development Plan. The foci of Phase II of the e-LPW in the future will include: to continually bridge the digital divide in workers, to integrate of network resources, to foster lifelong learning for workers, and thereby to enhance the quality of human resources and the competitiveness of industries. The following is a summary of CLA's promotional strategies and action plans of e-Learning for workers for 2008-2012.

In order to enhance the digital capability of workers, CLA will integrate the e-Learning websites of CLA units, promot the "learning coupon" (Table 2-4-1), establish the e-university for workers and promote e-Learning university program certification.

Table 2-4-1 Learning Coupon Implemental Procedures

Stage	Procedures
Courses to be taken by job applicants	Applicant ▶ Employment Service Center ▶ Digital Capability Test ▶ Recommendation of Appropriate Courses ▶ Issue of Learning Coupons
Reporting to class	▶ Bureau of Employment and Vocational Training-accredited e-Learning Center ▶ Reporting ▶ Registration of Applicant Data by e-Learning Center ▶ Applicants link to the Learning Coupon e-Learning Site at e-Learning Center ▶ Successfully logging in ▶ e-Learning begins
Digital capability enhancement assessment	▶ e-Learning completed ▶ Digital Capability Test (DCT) ▶ DCT Passing Grade60 marks ▶ Wishes for finding a job successfully

Source: Learning Coupon e-Learning Web, Bureau of Employment and Vocational Training (BEVT), CLA

I. Action Plans

Four action plans carried out: (1) to enhance worker digital capability by promoting the learning coupon and providing multidimensional courses. (2) To edit, revise, and develop more e-Learning courseware

for labor education by integrating the resources of e-Learning webs implemented by CLA, BEVT and IOSH. (3) To implement course certification, digitize question databases, provide efficiency certification services, and enhance the efficacy of various training courses through the regional e-Learning center. (4) To establish an occupational safety mechanism for training, skill inspection and employment by combining e-university for workers and the vocational training e-Learning webs.

II. Projected Benefits

The projected benefits of Phase II of the e-LPW implemented by CLA and its units in the next five years include:

(I) Qualitative Benefits

To encourage workers to participate in basic computer skill courses; to foster e-Learning instructors through e-vocational programs; and to build a all-in-1 e-Learning environment combining vocational training, skill certification, employment service, and labor education by integrating skill inspection and employment recommendation mechanisms.

(II) Quantitative Benefits

The indicators are to attain the goal of 100,000 viewers a year for the e-university for workers; production of e-Learning courseware for at least 10 subjects a year; and to work for the quality assurance of courseware to effectively enhance the level of e-Learning.

Additionally, to encourage enterprises to participate in the 2-hour e-Learning course certification policy; to implement 123 e-testing service websites; to establish 64 e-testing centers; to attain the goal of 13,000 workers' participation in the basic computer skill training course for the short run; and to encourage at least 1,500 workers to participate in e-Learning every year; and to promote e-community diversification.

2.5 Promoting e-Learning for Art and Cultural

The Council for Cultural Affairs (CCA) has planned and implemented the e-Learning for Art and Cultural Project, a subproject in the Digital Education and e-Learning Project under TELDAP, aiming to create an e-Learning environment for culture and art, and to establish an e-cultural society to enhance the general cultural and art creativity and competitiveness of Taiwan through continual improvement of the e-cultural and art classroom, e-cultural and art community, e-cultural and art databank, and the e-cultural and art information.

I. Promotional Strategies

The CCA promotional strategies for cultural and art e-Learning are as follows: to provide a quality, multidimensional, and comprehensive cultural and art learning environment; to emphasize cultural and art heritage; to foster instructors in culture- and art-related areas; to implement the Web 2.0 system to encourage young people to express and display their creativity and to establish e-communities for cultural and art learning based on a user-focus basis.

II. Action Plans

The CCA has implemented the CCA Cultural and Art e-Learning Web to integrate the administrative resources of CCA and its units and the cultural and art resources in various fields in order to create a single port for cultural and art e-Learning. The CCA also aims at enhancing the life aesthetics of citizens and at realizing the vision of life with culture and art with the cultural and art e-Learning courseware databank, and website maintenance and operation, marketing and promotional plans (Figure 2-5-1).

III. Projected Benefits

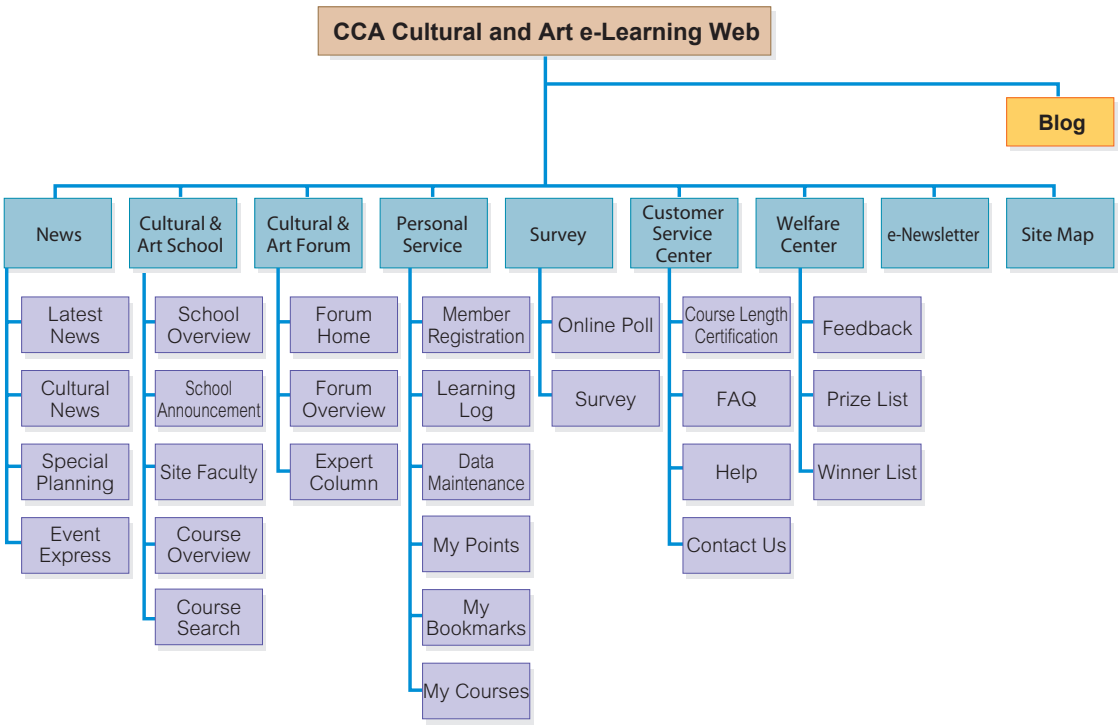
(I) Qualitative Benefits

To promote cultural and art course diversification; to provide new-generation cultural and art interactive e-Learning courseware; to conserve cultural and art resources with digital technology; to provide industries with value-added application of cultural and art e-Learning content; and to build an open cultural and art e-Learning platform for the public.

(II) Quantitative Benefits

To enrich the e-Learning database; to increase at least 30 e-Learning courses every year in 5 years; to publish at least 6 e-newsletters every year; to attract 300 members to build their own blogs; to increase 3000 new members a year; and to attain the goal of 100,000 viewers a year.

Figure 2-5-1 CCA Cultural and Art e-Learning Web Structure



Source: CCA

2.6 Conclusion

The application of ICT and the Internet is increasing. Studies on the application of ICT and the Internet on teaching and learning indicate that the content and teaching methods presented in e-Learning are to facilitate learners to learn, and to get work-related knowledge and skills to enhance organizational performance[1]. Rosenberg points out that e-Learning refers to the transmission of a large amount of solutions over the Internet for improving knowledge and performance[2].

The aims of the MOE's promoting e-Learning to formal education are to enhance the efficiency of educational systems, to promote the even distribution of learning resources, and encourage innovation and development of teaching, and to provide multidimensional learning channels by fostering e-Learning professionals, by developing demon e-Learning courseware, and by integrating digital archival resources to teaching. In addition to the emphasis in national programs and administrative policies, this requires the collaboration of base-level personnel of local governments and educational institutions in order to realize these visions by combining to the administrative system.

The aims of promoting e-Learning to lifelong learning of the CPA, CLA and CCA are to improve the professional competences of civil servants and labors, to enhance the cultural and art literacy of citizens, to promote the general advancement of Taiwan's human resources, and to boost industrial development through e-Learning by fostering professionals with multidimensional e-Learning competence, by enhancing e-Learning courseware quality, by building a quality learning environment, by improving the digital capacity of civil servants and labors, and by fostering instructors in culture and humanities.

It is hoped that the society can work together, make full use of e-Learning tools as a solution for enriching knowledge and enhancing efficiency, and to maximize the benefits of ICT and Internet in the areas of education and learning.

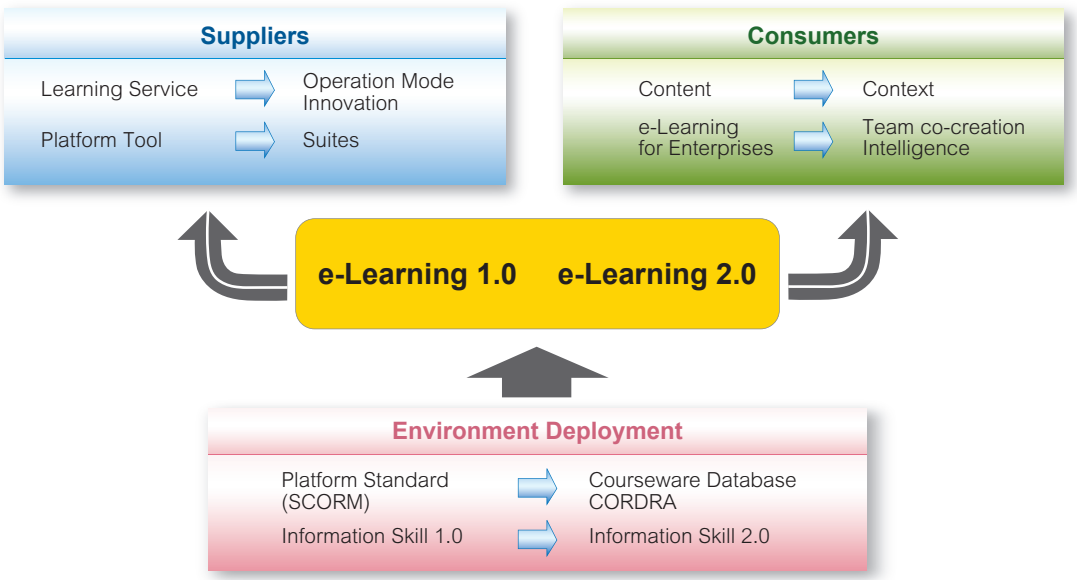
1 Clark, R. & Mayer, R. (2002). *E-Learning & the Science of Instruction*. Jossey-Bass

2 Rosenberg, M. J. (2001). *E-Learning: Strategies for Delivering Knowledge in the Digital Age* (W.L. Yeu, trans.). Taipei: McGraw Hill (Original work published in 2001).

Chapter 3
Promotion and Development of the e-Learning Industry

In order to cope with the advent of e-Learning 2.0, in addition to continuing the spirit of Phase I (2003-2007), the Industrial Development Bureau (IDB), the Ministry of Economic Affairs (MOEA), will implement the Phase II of the e-Learning Industry Promotion and Development Plan, a five-year plan for 2008-2012 (IDB Phase II Plan)[1], based on the new missions and goals diagrammed below (Figure 3-1-1).

Figure 3-1-1 Direction of IDB Phase II Plan



To satisfy consumers, the Enterprise 2.0 announced by Andrew McAfee[2] will be the focus of the IDB Phase II Plan, and SLATES (search, links, authoring, tags, extensions and signals) will be the architecture. To satisfy suppliers, in addition to integrating learning management platforms to enterprise information systems, courseware should meet the needs of immersive learning[3], mobile learning, and collaborative learning. Furthermore, to assist suppliers to maximize and internalize their scale of operations and to promote horizontal integration are the foci of the IDB Phase II Plan.

New information skills, or information literacy, should be reinforced for "teaching" and "learning", including Wikipedia, RSS feeds, blogs, social bookmarking, social networking, information creation tools, and virtual world tools. These seven categories of tools are essential drivers to promote e-Learning 2.0.

3.1 Visions, Goals and Promotional Strategies

I. Visions

The foundation for e-Learning industry development has been completed and obtained preliminary results during the IDB Phase I Plan. Therefore, the IDB Phase II Plan will combine emerging technologies with e-Learning for the following visions: (1) to assist enterprises to create operational performances and values by enhancing innovation, development, and problem-solving abilities with e-Learning 2.0; (2) to promote the international output of Taiwan's e-Learning industry by enhancing innovation, development, and service-oriented abilities with e-Learning 2.0.

II. Objectives

Objectives of the five-year IDB Phase II Plan and the performance indicators of 2008 are established based on the above-mentioned visions. They are explained as follows by enterprise and by industry (Table 3-1-1).

1 e-Learning Industry Promotion and Development Plan (2008-2012), Fifth Subproject of the Taiwan e-Learning and Digital Archives Program (TELDAP). http://idp.teldap.tw/
2 Andrew P. McAfee: Enterprise 2.0 (2006,Spring). The Dawn of Emergent Collaboration. MIT Sloan Management Review. (http://sloanreview.mit.edu/smr/issue/2006/spring/06/)
3 Lance Dublin. (2007). The Five Worlds of Learning 2.0. Speech presented at ASTD International Conference, Atlanta, USA.

Table 3-1-1 Objectives of IDB Phase II Plan

Target	General Objectives	Objectives for 2008
Enterprise	To establish knowledge networks for 5 focused industries. To enhance the e-Learning application to Level 3 or better performance of 50% large enterprises. To promote 30% large enterprises to apply e-Learning to training. To promote 5 projects through cooperation among ministries and commissions.	To establish knowledge networks for 1 focused industry. To enhance the e-Learning application to Level 3 or better performance of 10% large enterprises. To promote 10% large enterprises to apply e-Learning to training. To promote 1 project through cooperation among ministries and commissions.
Industry	Annual output of NT$25 billion. Annual international incomes of NT$3 billion. 20 indicative enterprises either implement or apply e-Learning through transformation; and 5 focused enterprises with an annual output of NT$1 billion.	Annual output of NT$13 billion. Annual international incomes of NT$800 million. 3 indicative enterprises either implement or apply e-Learning through transformation.

Source: IDB, MOEA

(I) Enterprise Objectives

To expand the domestic e-Learning market through the effective use of the reward system; and to assist enterprises to enhance the efficacy of e-Learning application with the four-leveled training evaluation model proposed by Donald Kirkpatrick in order to make e-Learning an indispensable part of enterprise development[4].

(II) Industry Objectives

To develop industry core competencies; to innovate learning, service and operational models; to enhance the global competitiveness of e-Learning content and service; and to enter the international market through horizontal integration with hardware and software industries or strategic alliance among industries in order to expand the overseas market.

III. SWOT Analysis

Based on the said objectives, a SWOT analysis on promoting Taiwan's e-Learning industry has been conducted. In Strength, both the amount of academic publications and the amount of publications being cited concerning e-Learning are quite high that this favors future expansion and development. In Weakness, the scale of Taiwan's e-Learning suppliers is rather small that it is difficult for them to undertake international projects; also, there are very few large enterprises willing to support e-Learning development. In Opportunity, Taiwan has advantage in the data communication industry, and huge opportunities from the transformation of traditional extended education business. In Threat, there are challenges to the products and services of domestic suppliers as a result of the continual technological advancement. Also, e-Learning has been largely promoted in America, the EU, Japan, Korea and Southeast Asian countries, thus bringing threats to Taiwan's e-Learning businesses.

IV. Promotional Strategies

The promotional strategies of the IDC Phase II Plan are established to accomplish the future visions and objectives in terms of e-Learning suppliers and consumers.

Promotional strategies for suppliers include: (1) value creation: to assist suppliers to apply emerging technologies to create value and performance for customers; (2) horizontal integration: to promote e-Learning businesses to integrate with hardware, software and content providers in order to form a strategic alliance; and (3) international market: to support and encourage suppliers to export Taiwan's e-Learning products and services worldwide.

Promotional strategies for consumers include: (1) market facilitation: to encourage more enterprises to implement e-Learning; (2) application entrenchment: to expand the linear and plane effect of e-Learning implementation by assisting indicative organizations or groups to implement the knowledge network; and (3) operation innovation: to study and analyze the successful examples of innovative learning and application of e-Learning 2.0 from enterprises at home and abroad in order to create the Taiwan-specific application modes and opportunities.

4 Kirkpatrick, D. L. (1998). Evaluating Training Programs: The Four Levels. (2nd ed.). San Francicso: Berrett-Koehler.

3.2 Action Plans for Enhancing Industrial Competitiveness

The action plan enhancing industrial competitiveness in the spirit of e-Learning 2.0 aims at utilizing simple technologies and design to enhance industrial competitiveness by means of market facilitation, application entrenchment, and operation innovation.

I. Action Plans

(I) Market Facilitation

In market facilitation, we have been working on a cooperation project with the Taiwan TrainQuali System (TTQS) currently promoted by the Bureau of Employment and Vocational Training (BEVT), Council of Labor Affairs (CLA), since 2008 in order to replace part of the physical TTQS courses with e-Learning courseware, because there are hundreds of enterprises enrolling in the TTQS every year. This way, these enterprises may have the opportunities to contact with and apply e-Learning, and this can encourage and stimulate more enterprises to implement e-Learning.

(II) Application Entrenchment

The aim of application entrenchment is to select focused industries every year and assist them to implement the industrial knowledge network. For example, in Year 1 (2008) of the project, the Taiwan Electrical and Electronic Manufacturers' Association was assisted to implement the general energy-using products (EuP) green chain knowledge network[5], the Chi Mei Optoelectropnics to implement a green chain knowledge network for its upstream suppliers, and the VICTOR Taichung Machinery Works to implement a machine tool industry knowledge network for its downstream customers. After the operations of these networks stablize, we will assist them to implement the e-Learning-2.0-based knowledge networks in 2009 in order to entrench the application of e-Learning 2.0 and to expand the application from point through line, and then to plane, and gradually to the entire industry

(III) Operation Innovation

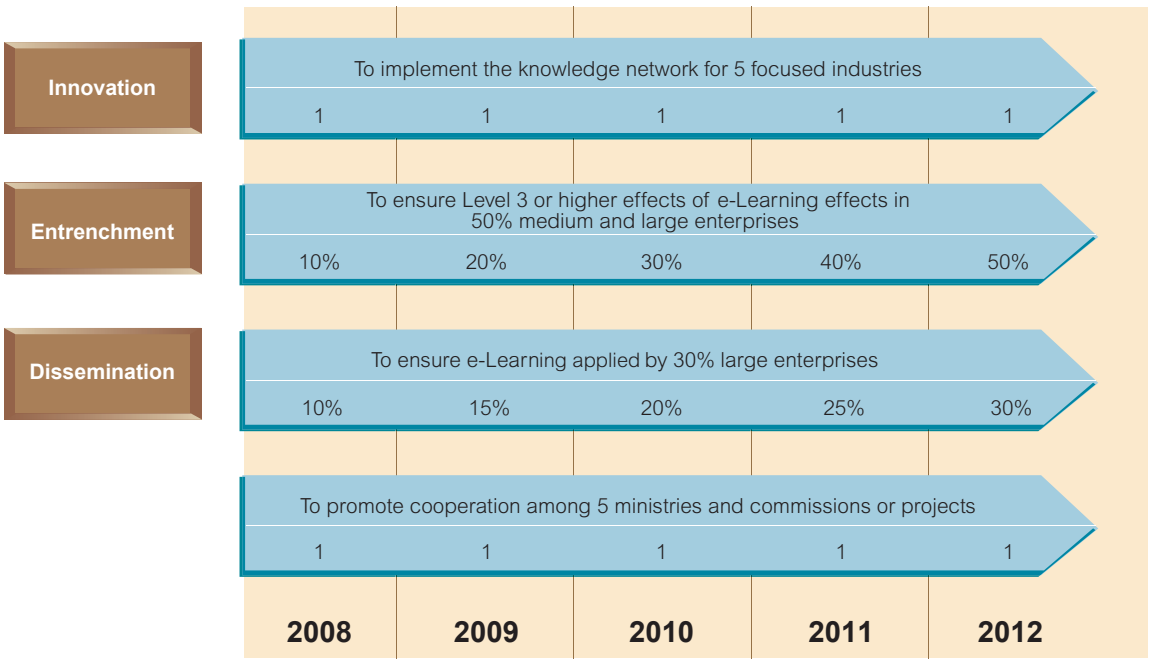
The innovation of e-Learning application is the focus of operation innovation. By doing so, the application of e-Learning can be spread to more enterprises. The innovation items include the analysis of e-Learning 2.0 trends and case study which investigate the trends of collaborative, rapid, informal, immersive and

mobile learning, and study cases applying e-Learning 2.0 overseas in order to provide a reference for domestic industries to apply e-Learning 2.0 to their operations, and e-Learning businesses to develop relevant products.

II. Projected Benefits

The projected benefits include the utilization of e-Learning 2.0 by enterprises and the enhancement of capability in the innovation of operations and service orientation, and to achieve the vision of building Taiwan into a model e-Learning country. The projected performance indicators for 2008-2012 are diagrammed in Figure 3-2-1.

Figure 3-2-1 Indicators of Annual Industrial Competitiveness Enhancement

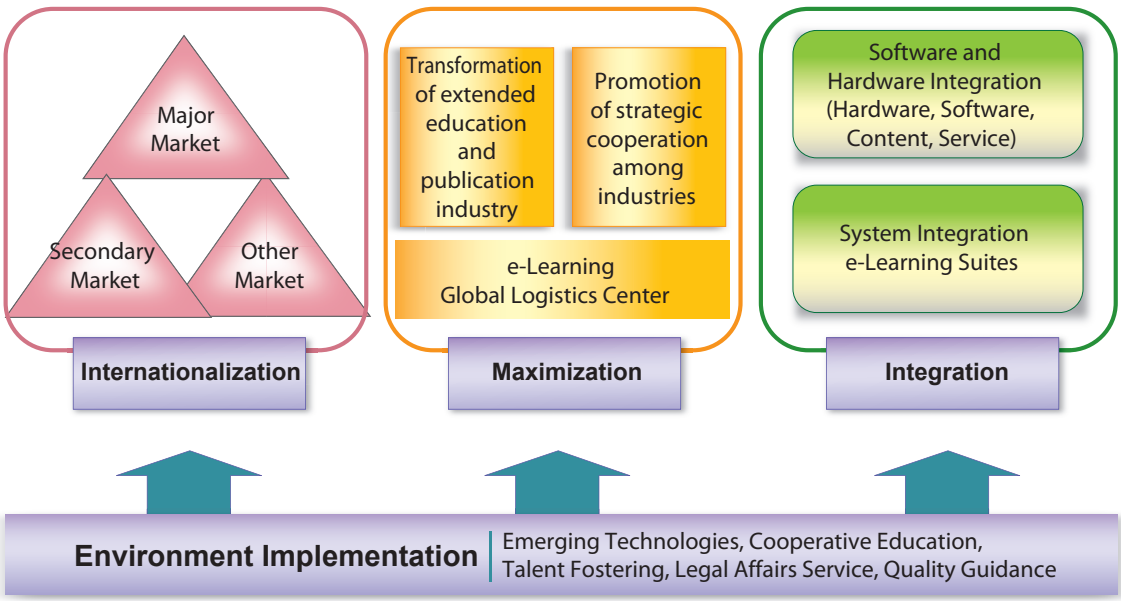


5 The aim of the EuP Directive 2005 established pursuant to Article 95, EU Treaty, is to establish a framework for the setting of ecodesign requirements for energy-using products, to ensure the free circulation of EuP within EU countries, to enhance the environmental performance of EuP for environmental protection, to facilitate the stable supply of energy, and to enhance the competitiveness of the EU economy without an equal treatment of the benefits of industries and consumers

3.3 Action Plans for Learning Industry Transformation and Upgrade

Based on the foundation established from the results of the IDB Phase I Plan, the aim of the action plan for learning industry transformation and upgrade is to accelerate the growth and development of the overall industry by means of horizontal integration, internationalization and value creation as shown in Figure 3-3-1.

Figure 3-3-1 Action Plans for Learning Industry Transformation and Upgrade



I. Action Plans

Individual action plans are proposed for each of the four dimensions, internationalization, maximization, integration, and environment implementation, to assist upgrade and transformation of the e-Learning industry.

(I) Internationalization

At present, America and China are the major markets in the world, and e-Learning suppliers will be assisted in cultivating these two markets. The Southeast Asian market (Japan and Korea) is the secondary market, as their cultural characteristics are similar to that of Taiwan (e.g. extended education tradition), e-Learning products from Taiwan have potential in these countries. Opportunities will be created through cooperation with local channels and businesses. Additionally, many domestic suppliers have made deployments in other Asia countries, such as Vietnam.

(II) Maximization

Extended education is an important learning-related industry. Therefore, assistance has been given to English extended education businesses in 2008 to promote e-Learning transformation by setting e-Learning model business. In the future, further guidance will be given to model extended education suppliers with successful transformation experience to launch cooperation with international extended education suppliers in order to extend to the international market. Also, assistance will be given to four leading domestic publishers and the three leading publishing channels in order to set model businesses for e-Learning application. Textbook, online test and language learning book publishers will be the targets of guidance for 2009-2010. Guidance for strategic cooperation will be given to suppliers during 2008-2010 for maximization through group cooperation. Additionally, an e-Learning global logistics center will be established during 2009-2012 by building a portal for the industry in order to provide e-Learning suites for the global e-Learning market.

(III) Integration

Similarly, as most e-Learning businesses in Taiwan are small and medium enterprises (SME) and unable to launch mass production and application, it is thus necessary to cultivate new markets and provide complete e-Learning suites through hardware and software integration, system integration, and horizontal integration in order to promote and facilitate the mass development of e-Learning industry.

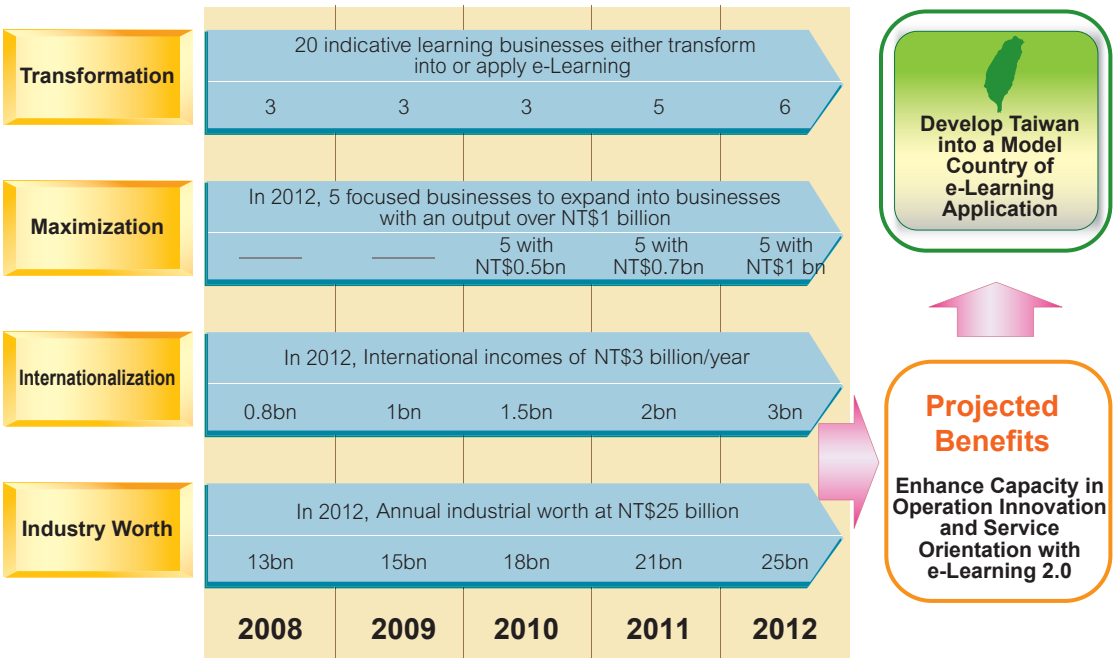
(IV) Environment Implementation

In order to develop the core capacity for businesses to compete with international businesses, it is necessary to provide them with the basic services through environment implementation, including emerging technologies, cooperative education, talent fostering, legal affairs service, and quality guidance, hoping to maximize profits for businesses by providing them with a well-established environment.

II. Projected Benefits

The projected benefits and indicators for learning industry transformation and upgrade for 2008-2012 are as follows: (1) to promote 20 indicative learning businesses to either transform into or apply e-Learning; (2) to guide 5 focused businesses to expand into businesses with an output over NT$1 billion; (3) to assist businesses to enter the international market and to ensure an annual international incomes of NT$3 billion; and (4) to boost annual industrial worth to NT$25 billion (Figure 3-3-2).

Figure 3-3-2 Indicators of Annual Performance of Learning Industry Transformation and Upgrade



3.4 Development and Application of Core e-Learning Technologies

This section describes the problems that Taiwan's e-Learning industry faces and the trends of e-Learning technology development, and investigates the action plans, performance indicators and projected benefits corresponding to technical and non-technical issues.

I. Action Plans

Based on the concepts of e-Learning 2.0, collective intelligence sharing, social computing, and smart listening, speaking, reading and writing learning technologies will be good opportunities for Taiwan to develop e-Learning industry. The derivative technical action plans are (1) finding suitable learning contents from the information overloaded network; (2) finding qualified area-specific experts in fast-growing network communities; and (3) offering self-assessment services in the absence of Mandarin teachers. The non-technical issues and action plans include: (1) reinforcing learning resource integration and value-added application; (2) forming industrial value chain and service system; and (3) integrating e-Learning and Mandarin learning businesses.

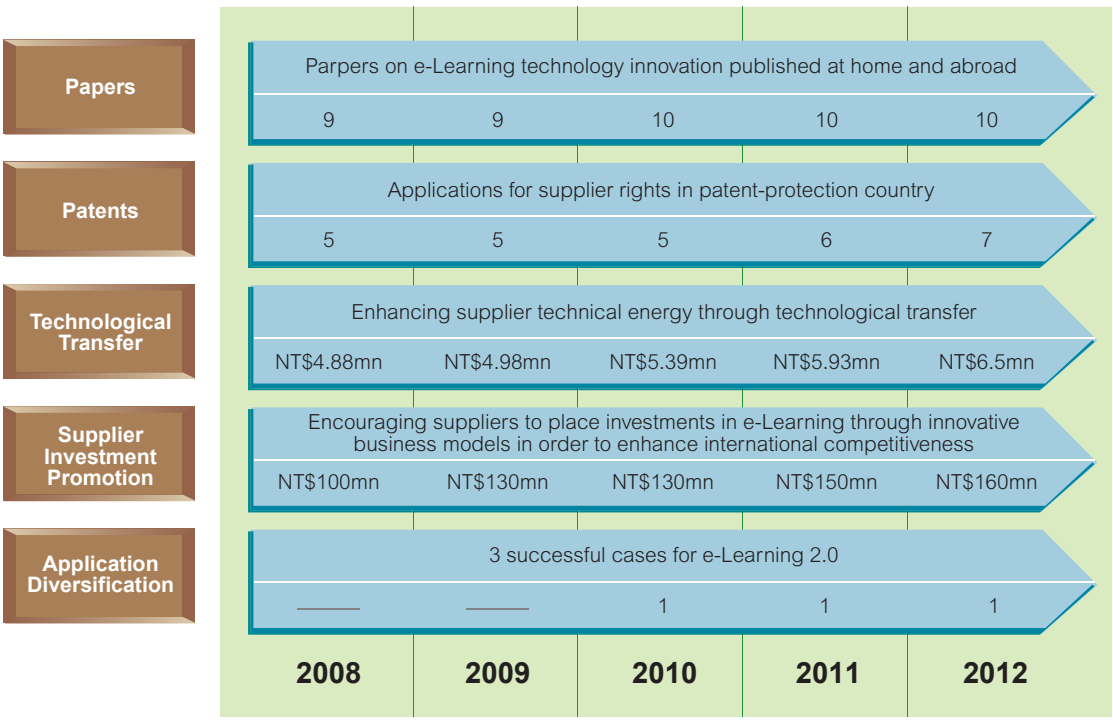
II. Projected Benefits

By applying the Web 2.0 technology, teachers and students may experience teaching and learning that is different from that of the past. This will surely bring new opportunities for e-Learning industry development. The future achievements are described in terms of performance indicators and benefits.

(I) Qualitative Benefits

To create the Learning 2.0 self-learning model and to assist domestic e-Learning businesses to obtain market advantages by making full use of Taiwan's broadband and WiFi and advantages in hardware R&D and manufacture and by integrating the advantages of Taiwan's data communication, educational, cultural and creative industries. Also, to develop Taiwan's first online listening, speaking, reading and writing community learning service platform in order to develop Taiwan into the global Learning 2.0 technology development and service operation center for Chinese Language.

Figure 3-4-1 Annual Indicators of Core Domains in e-Learning Technology Development



(II) Quantitative Benefits

To facilitate user participation and interaction, collective intelligence sharing technologies are developed and collaborative concept space is established in order to enhance the effect of information search and to develop social computing technologies. Additionally, online intelligent listening, speaking, reading and writing learning technologies are developed to satisfy the needs of learning languages ubiquitously.

Summing up the above directions of development, it is projected that papers, patents, technological transfer, supplier investment promotion and application diversification will be the core domains of e-Learning technology development. The projected performance of each of these domains for 2008-2012 is shown in Figure 3-4-1.

3.5 Conclusion

Personalized instruction and learning-on-demand have been the dream of education workers. Therefore, the IDB promotes the IDB Phase II Plan to facilitate and accelerate the promotion of e-Learning.

Following the introduction of Web 2.0 and the interactions between the pull of demand and the push of technology, the efficiency and efficacy of informal learning enhance rapidly. Therefore, in the IDB Phase II Plan, the IDB assists organizational users to accumulate intelligence assets with e-Learning in order to enhance organizational competitiveness on the one hand; and helps e-Learning businesses to entrench their expertise in order to turn e-Learning industry into an engine that boosts national competitiveness enhancement on the other.

The time of e-Learning 2.0 has come. However, there is no immediate progress without adjusting our instructional habits and learning culture. Therefore, though we may not overestimate the short-term benefits of the IDB Phase II Plan, nor should we underestimate its influence in the long run.

Chapter 4
Research and Development of Basic Theories and Prospective Technologies

To enhance Taiwan's e-Learning research energy, the National Science Council (NSC) initiated the Taiwan e-Learning and Digital Archives Program (TELDAP) in 2008 and planned the Research and Development of Digital Archive and e-Learning Technologies Project, a subproject under the Research and Development of Digital Technologies Project in order to engage in the research and development of basic theories and prospective technologies.

4.1 Visions and Objectives

I. Visions

Leaders of the Group of Eight (G8) nations passed the IT Charter at the G8 Summit Okinawa 2000 which affects the future global IT development and indicated that IT will be one of the most powerful technologies to shape the 21st century. At the World Congress of Information Technology (WCIT) held in June 2000 in Taipei, most world technology leaders emphasized that the Internet and education will be two decisive factors affecting national competitiveness, and thus recommended governments reinforce education on the IT application.

Taiwan has established a solid foundation for e-Learning-related research. In the future, it will be necessary to foster interdisciplinary talents and reinforce fundamental research in all aspects, particularly the fundamental research of e-Learning, in order to maintain and even surpass the previous achievements and advantages. The potential subjects of research may include:

- **Prospective Assessment:** The e-Learning environment provides a new medium and interface for examining how humans learn, and the limits and barriers of learning. By establishing the learning theories of e-Learning, we may provide future researchers with an angle of analysis when observing learning and instructions for establishing a learning environment. This Project will investigate the new assessment models in e-Learning, how to establish environments or systems appropriate for assessing e-Learning, and how to effectively assist learning assessments with e-Learning technologies.

- **Learning Motivation:** Given that the environment of e-Learning is ubiquitous, compared with traditional classroom learning, e-Learning will emphasize more on effective exploration and self-learning motivation. Though the influences of learning motivation on learning behavior and performance in traditional classroom learning have been widely verified, its effects on e-Learning need further and holistic investigation and verification.

- **Brain and Learning:** While language materials or characteristics of thinking patterns may be culture-specific, to verify whether relevant studies are cross-linguistic or cross-cultural or linguistically and culturally specific with local research will be exceptionally meaningful for developing a local-learner-focus e-Learning educational platform. Results of such research can also benefit the Chinese e-Learning Plan and provide the plan with solid research references.

- **Leaner Model and Portfolio:** Learning transformation will not be established automatically after an information update, particularly in professional learning. Therefore, it is necessary to consider how to transform information on the Internet into internalized knowledge that is meaningful to learners.

- **Society and Value Ethics:** The progress in the Internet technology has brought enormous influence to education, schools, learning, students and the entire society, forming conflicts and challenges for both the physical and psychological aspects of humans and the entire society. Therefore, how to surpass the existing scope of research of network in personal knowledge learning and to avoid or reduce the negative impact it brings have become the foci of Phase II of the National Science and Technology Program for e-Learning.

- **e-Learning Behavior of People in Middle, Prime and Old Age:** Traditional students are the focus of most studies and discussions on the modern e-Learning environment. As the demand increases, it has become more important to let adults or seniors possess healthier physical and psychological conditions, develop learning motivation and engage in learning activities.

- **Creation and Creativity:** "Reinforcing the development of innovation and re-Learning capabilities" has been the focus of modern educational reforms. In the *White Paper on Creative Education*[1] announced

1 Ministry of Education. (2002). White Paper on Creative Education. Taipei: Ministry of Education

by the Ministry of Education (MOE) in 2002, the present status of creativity education for different levels of educations and in different parts of the world are investigated in order to realize the goal of the "Republic of Creativity" (ROC).

Additionally, the popularization of the Internet has facilitated the emergence of various new learning methods. At the 26th Executive Yuan Science and Technology Advisory Conference held in Taipei in 2006, in addition to the recommendation of promoting the UNS (Ubiquitous Network Society), life enhancement application should also be planned and promoted.

On the other hand, the advisory board also planned the development of the six strategic industries, including the intelligent living space, intelligent vehicles, intelligent robots, flexible electronics, RFID (Radio Frequency Identification), and nanotechnology. Therefore, through the promotion of national programs, prospective technologies can be developed in Taiwan in a multi-concept and multi-technology perspective to assist the development of relevant industries and to enhance Taiwan's international competitiveness. These include:

- **Game-based e-Learning:** The digital game industry will become a prosperously developed industry, and the technologies, design theories and principles used are worthy of research. For example, emotioneering refers to the series of learning affections, motivations, involvement and emotions induced to the learner who has identified with the protagonist in the game and interacted with the virtual role and immersed in the plot of the game world.

- **Learning Machines and e-Learning Toys:** To design learning machines for a particular science, e-Learning toys, and educational robots is one of the important directions of e-Learning development. By embedding chips with computing, detecting and recording functions in e-Learning toys, we can collect information concerning the interactive behaviors and learning portfolio of children and establish accurate learning portfolio model in order to provide adaptive feedback. Additionally, educational robots are affective-interaction-based, besides strengthening the digital attachment with learners, as they are physical (they have a face, limbs, and a body), it is more easily to integrate learning model or instructional strategies with gestures or facial expressions. Therefore, the application of educational robots is comprehensive, making it a perspective technology for development.

- **One-by-One and Ubiquitous Learning:** One-by-one refers to one student with at least one e-leaning aid. Due to the portability and mobility of e-Learning aid, more and more informal learning has become formal learning, making learning ubiquitous. One-by-one and ubiquitous learning include one-by-one e-classroom, informal learning, outdoor learning, context awareness learning, and seamless learning.

- **Semantic e-Learning Technology:** Semantic technology refers to the adding to computer tags to

human creations, such as articles, films, songs, and paintings, to provide learners with easy access, experience and absorption of these "materials". This is a prospective e-Learning technology encompassing a wide range of technologies, including the ontology management system, ontology-based learning application, and learner agent. The semantic e-Learning technology includes the following development items: ontology, intelligent agent, semantic search, knowledge and instructional management, learning design, and data mining.

- **Design and Development of Innovative e-Learning Content:** Technically, digital simulation and 3D multimedia technologies should be considered in the design and development of e-Learning contents. In presentation, it is necessary to consider the characteristics of carriers and specifications of screens. Therefore, to balance the content, technology, and presentation of e-Learning contents is the major strategy for developing e-Learning contents.

II. Objectives

In order to enhance Taiwan's e-Learning research energy and promote the development of relevant industries, the Research and Development of Digital Archive and e-Learning Technologies Project of TELDAP will integrate domestic research resources by forming a multidisciplinary research team and establishing a large research center. The targets include: to consolidate and enhance Taiwan's international academic position and leadership in e-Learning, and to promote interdisciplinary academic cooperation and development for e-Learning at home and abroad.

III. SWOT Analysis

Based on the above objectives, results of the SWOT analysis of e-Learning basic theories and prospective technologies development in Taiwan are as follows.

(I) Strength

In academic research, both the amount papers published by domestic scholars in the six leading e-Learning SSCI(Social Sciences Citation Index) journals and the frequency of quotations from these papers are ranked third in the world, indicating that Taiwan has an outstanding academic position in e-Learning. In addition to the outstanding academic performance, Taiwan has made important contributions to Asian academic communities. For example, the Asia-Pacific region and global Chinese e-Learning headquarters are established in Taiwan.

e-Learning has become a national program for the following reasons. First, the e-Learning industry has been growing rapidly, with a compound annual growth rate much higher than the average in Europe,

America and Asia in the last three years. Also, in terms of population ratio, the community involving in e-Learning research is huge. In addition to educationalists, there are many scholars with IT background engage in e-Learning research.

(II) Weakness

Though there are many papers published in leading SSCI journals by domestic scholars, Taiwan's influence in the international e-Learning academic circles has not increased accordingly, because most research follows international trends, and only a few have innovative and prospective insights. Also, Taiwan lacks an interdisciplinary research team for e-Learning, particularly the participation of psychologists and brain scientists. As a result, it is difficult to plan and initiate research with far-reaching influence from a broader vision.

The lack of vertical integration is the crux. At present, though there are great ideas in research (upstream), the application of these ideas into practice is difficult. In industry (midstream), it lacks a locomotive area of applications to promote development of e-Learning industry in order to trial products before entering the international market. In application (downstream), though people have gradually accepted the concept of lifelong education, there is still large space for improvement for applying e-Learning technology to lifelong learning.

(III) Opportunity

In addition to including digital content in the "Two Trillion & Twin Star Industrial Development Program", the government has fostered digital content talents with interdisciplinary expertise. Therefore, there is a possibility to form a multidisciplinary research team. Moreover, with the promotion of the Department of Science Education, National Science Council; the Department of Industrial Technology, Ministry of Economic Affairs; and Phase I of the National Science and Technology Program for e-Learning, domestic experts and research teams has gathered together to engage in the R&D of e-Learning technologies. The Global Researcher and Testbed Network for 1:1 Technology Enhanced Learning (G1:1) has also displayed its influence. As top research communities in the USA, Canada, France and Japan have been inspired, there are opportunities to engage in close cooperation with Taiwan's research teams.

Given that to promote research and industry integration is one of the foci of national programs, there is a possibility for vertical integration and to expand the application market of the industry in order to achieve this aim. Also, with Taiwan's advantage in software manufacture, the advantage of mono-linguistic and mono-ethnicity of Chinese worldwide, and the extensive channels for product sales, we may create a Chinese market and lead the global trend to assist the development of e-Learning.

(IV) Threat

Industrialized countries have begun large interdisciplinary research projects and have established support policies to ensure the favorable environment for development. Asian countries follow suit by continually increasing research and development (R&D) funds. These will threaten Taiwan's e-Learning leadership in Asia.

4.2 Promotional Strategies

In order to realize the above vision and to achieve its objectives, the Research and Development of Digital Archive and e-Learning Technologies Project plays an important role. In general, the project has three promotional strategies: formation of a multidisciplinary research team, analysis of international research trends, and reinforcement of e-Learning researcher cultivation. Together with the establishment of the exchange and promotional mechanisms, these strategies provide researchers with adequate opportunities for exchange. The contents of work are as follows:

- **Aggressive Promotion of International Cooperation**

To learn the methods and experience of research from top research teams, to accelerate and enhance research quality, and to maintain and enhance Taiwan's academic position in the world's top three through collaborative R&D with international top laboratories and research teams and international exchange of research issues and development.

- **Aggressive Participation in International Academic Activities**

To encourage Taiwanese scholars to aggressively participate in international academic activities in order to enter the international stage, broaden international vision and to grasp first-hand research trends early.

- **Participation in Research Communities of Major Areas**

The government should promote the establishment and operations of research communities of special interests in order to promote further R&D of such subfields.

- **Vertical Integration**

The sustainable development of e-Learning requires the vertical integration of upstream (research), midstream (industry), and downstream (application) resources to promote innovations and high-quality research findings through cooperative education and by establishing various demonstration centers in order to enhance the industrial worth and accelerate the development of Taiwan's e-Learning industry.

- **Reinforcement of e-Learning Fundamental Research**

e-Learning research requires talents from different fields in order to reinforce the fundamental research of different aspects. In addition to the participation of scholars with education and IT backgrounds, it needs the involvement of psychologists and brain scientists in order to increase Taiwan's academic influence.

- **Design of Prospective e-Learning Strategy**

To ensure the better application of e-Learning research, researchers must follow future trends to design prospective learning strategies.

- **Establishment of Prospective e-Learning Environment**

With the portability and wireless mobile computing functions of one-by-one e-Learning aids, the learning and interaction models in e-classrooms will become more multidimensional and flexible. The context awareness learning established by e-Learning objects with embedded diction chips, the affective-interaction-based educational robots, learning machines, and e-Learning toys are important strategies for establishing a prospective e-Learning environment.

- **Development of e-Learning Content**

Contents should be developed for different subjects; digital simulation and 3D multimedia technologies should be considered in technology; the characteristics of carriers and specifications of screens should be considered in content presentation. Therefore, balancing the content, technology, and presentation of e-Learning contents is the major strategy for developing e-Learning contents.

4.3 Action Plans

To ensure the smooth promotion of the Research and Development of Digital Archive and e-Learning Technologies Project, the following five action plans are established based on the three promotional strategies specified in Section 4.2.

I. Open Request for Excellent Research Centers and Research Teams

The establishment of excellent research centers and the formation of outstanding research teams will facilitate the enhancement Taiwan's international competitiveness in e-Learning. Work items will include the research of prospective e-Learning models, the establishment of a vertical integration mechanism for e-Learning, the cultivation of a quality e-Learning industry, and the promotion of cooperation international top research teams. The research of prospective e-Learning model covers three aspects: research of e-Learning basic theories, development of prospective e-Learning environment and technologies, and design and development of innovative e-Learning contents.

In order to effectively implement the items for an open request for excellent research centers and research teams, and to control their quality, relevant committees shall be established as needed to promote the project and relevant requirements shall be revised.

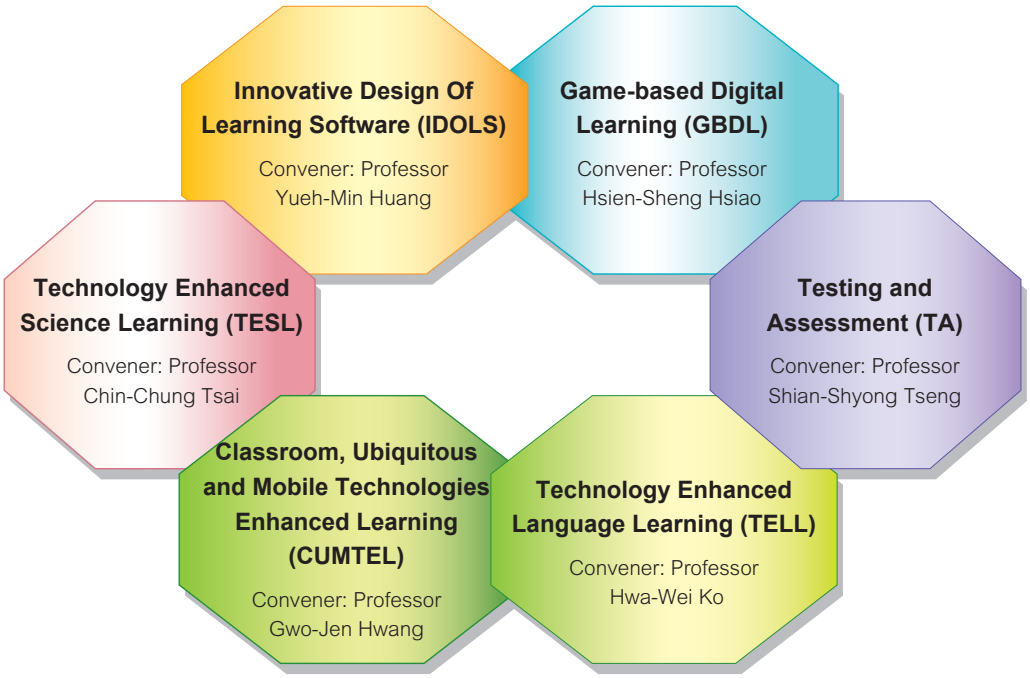
II. Status Inspection and Trend Analysis of Prospective e-Learning Areas

It is estimated that five to eight prospective area survey and analysis teams will be formed to investigate the present status and analyze the trends of research and application of particular topics. These prospective area analysis teams will hold discussion meetings and seminars at planned intervals, and project discussion meetings in coordination with the annual achievement presentation of the National Science and Technology Program for e-Learning. At present, the planned prospective area survey and analysis teams are shown in Figure 4-3-1.

III. Establishment and Maintenance of Promotional Platform

To ensure the best promotion of research achievements, a promotional platform will be established for relevant organizations and the public interested in applying, utilizing and understanding such achievements. The platform will provide an e-Learning portal and store the resources and achievements of the Research

Figure 4-3-1 Prospective e-Learning Area Survey Team



and Development of Digital Archive and e-Learning Technologies Project for the public to browse and access to the required information and discuss over the Internet.

IV. Establishment of Research Database

In addition to the NSC website databases, research databases will be integrated and expanded continually establish through analysis and integration, and a joint search and knowledge sharing mechanism will be established to facilitate researchers to exchange and search for information (e.g. search the results of various projects, voluntary upload of research results and dynamic information for sharing); and the NSC to integrate meta analysis and data mining technologies, and conduct KPI (Key Performance Indicators) analysis, efficacy analysis, differential analysis and make relevant forecasts with the abundant research results.

V. Integration and Promotion of Project Achievements

Industrial, governmental and academic energy, and up-, mid- and downstream resources will be integrated through various achievement presentations to expand the efficacy of the Research and Development of Digital Archive and e-Learning Technologies Project. The work items include continually organizing achievement presentations, seminars and training programs for the e-Learning Excellent Research Center, e-Learning Excellent Research Team, e-Learning Fundamental Research, Research and Development of Prospective e-Learning Environment and Technologies, Research and Development of e-Learning Contents and Prospective Technologies, and e-Learning Cooperative Education.

4.4 Promotion, Application and Projected Effectiveness

I. Promotion and Utilization

Various new learning models and research topics have been developed from the National Science and Technology Program for e-Learning. Over the past few years, we have obtained abundant research achievements with comprehensive contents. The utilization of these achievements includes:

- **Establishment of a Vertical Integration Mechanism:** An e-Learning research laboratory and museum with wireless guide will be established for teachers, students and administrators to enthusiastically participate in e-Learning.

- **Cultivation of Quality e-Learning Industry:** To develop practical technologies and e-Learning contents, to foster enterprise R&D potential and talents, and to encourage patent development and technological transfer are the foci of promoting research achievements to industry.

- **Promotion of Cooperation with International Top Research Teams:** To encourage domestic scholars to aggressively organize and participate in top international symposia in order to enter the international stage, to broaden their international view and to interact with top international scholars.

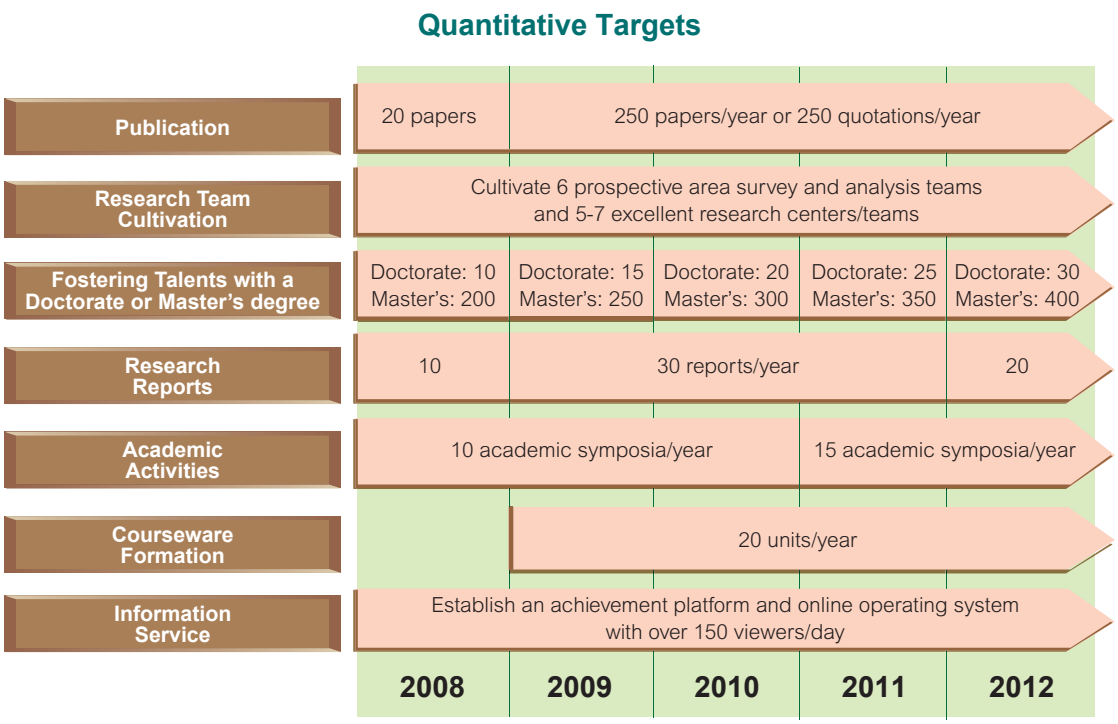
- **Establishment of a Promotional and Exchange Platform:** By establishing the achievement promotional platform, we can provide a single portal for researchers to access to and use relevant research achievements and organizations and the public to use or implement existing research achievements.

- **Organization of Various Promotional Seminars and Presentations:** By presenting various research achievements, we can integrate the industrial, governmental and academic energy, and up-, mid- and downstream resources to expand the efficacy of the project.

II. Projected Efficacy

The projected quantitative targets in the research and development of basic theories and prospective technologies for e-Learning during 2008-2012 under the Research and Development of Digital Archive and e-Learning Technologies Project are shown in Figure 4-4-1.

Figure 4-4-1 Quantitative Indicators of Projected Results



4.5 Conclusion

By the research and development of fundamental theories and prospective technologies for e-Learning, and promoting the Research and Development of Digital Archive and e-Learning Technologies Project, we can integrate domestic academic research and industry and cross over industry, government, and academic circles with the country's power, and aggressively participate in top international symposia and engage in collaborative research with international top laboratories and research teams in order to broaden Taiwan's international view.

With the prospective technology development and vertical integration mechanisms, we can promote the prosperous development of e-Learning industry and thereby to increase Taiwan's e-Learning worth. Also, by planning and utilizing the research databases, we can provide researchers with an additional convenient and highly extendible modularized search tool.

Last, by combining the achievement interview of research units and school promotion, the e-Learning research results of all research units may be applied to education of all levels more appropriately. With various industrial promotional activities, we can promote the exchange between the e-Learning industry and academic circles. By establishing and implementing an exchange mechanism for research teams, exchange among research talents and communities becomes more frequent and more research resources can be integrated and shared. In addition to promoting academic seminars, this can facilitate further exchange. Research teams can realize resource integration and establish partnership with other project teams with such mechanisms, and increase the depth and breadth of research through exchange seminars and forums.

On the other hand, this can promote cooperation and exchange between relevant government research units and academic research teams to facilitate the promotion of research achievements to keep in pace with government policies in order to completely grasp the international trends and to efficiently exert the influence of government policies and resources to quickly spread rich and practical research results across Taiwan and to display Taiwan's international influence.

Chapter 5
e-Learning for Chinese Language

Following the increasing global influence of Chinese people, learning Chinese has become a trend[1]. It is estimated that the scale of the global Chinese language (Huayu) market will increase to US$60 billion within the next decade, and there are even more opportunities for derivative market services. The aim of Phase II of the Taiwan e-Learning and Digital Archives Program (TELDAP) is to turn digital archives and e-Learning information into knowledge and popularize them in order to develop and construct a knowledge-based society and ultimately to enhance national competitiveness.

This chapter first introduces the visions and promotional strategies of the e-Learning for Chinese Language Project, and then elaborates how participating ministries and commissions promote the project. These include the Digital Teaching Capability Training Plan for Personnel who Teach Chinese as Second Language of the Ministry of Education (MOE); Chinese e-Learning Industry Promoting Subsidiary Program of the Industrial Development Bureau (IDB), Ministry of Economic Affairs (MOEA); Huayu e-Learning Program for Overseas Chinese of the Overseas Chinese Affairs Commission (OCAC); the Chinese as Second Language (CSL) e-Learning Project of the National Science Council (NSC); the A Community Portal for Museum-School Collaboration: Applications of Cultural Resources on Chinese Language Learning of the National Palace Museum (NPM); and the e-Learning Plan of Hakka Language and Culture for Global Chinese of the Council for Hakka Affairs (CHA).

1 David Graddol(2004). The Future of Language. Science magazine: http://www.sciencemag.org/cgi/content/short/303/5662/1329

5.1 Visions and Promotional Activities

I. Visions

The aim of the e-Learning for Chinese Language Project is to integrate academic, industrial, and state resources to develop high-quality e-Learning products for learning Chinese through government integrating of resources of ministries and commissions concerning the e-Learning of languages. In addition to digital learning and instruction of languages, the project aims at spreading the culture and display the diplomatic and business energy of Taiwan.

II. Promotional Strategies

In Taiwan, the Chinese language learning has been combined to digital education and is promoted through the following six strategies:

(I) Enriching Chinese Language e-Learning Teacher Base

Taking charge by the Computer Center, MOE, indicators for assessing the pedagogic competence of Chinese language teachers will be designed, blended courses will be planned and training programs and exchange seminars will be held to equip Chinese language teachers with capabilities in digital teaching, e-Learning courseware design and development.

(II) Chinese e-Learning Industry Promoting Subsidiary

Directed by the IDB, there are three plans under Chinese e-Learning Industry Promoting Subsidiary Program Firstly, it is to provide guidance for the commercialization of Chinese language and establishment of related operational models in order to help domestic suppliers to engage in international operations. Secondly, it is to establish Digital Huayu e-Learning Centers (CLASS-Net) in different parts of the world on an annual basis with the resources existing among Chinese learning centers across the world. Lastly, it is to establish global chain channels for promoting excellent Chinese learning products from Taiwan and mechanisms for certifying excellent Chinese learning products from Taiwan.

(III) Promoting the e-Learning and Web-based Learning of Chinese Language to Overseas Chinese

The OCAC promotes the e-Learning and web-based learning of Chinese language to overseas Chinese through the following three aspects: to implement and maintain the website of "e-Learning Huayu of Taiwan"; to aid Chinese schools and cultural and education institutions overseas to establish the Digital Huayu e-Learning Center; and to reinforce international publicity of Chinese language.

(IV) Assembling Energy for the Chinese as Second Language (CSL) e-Learning Project

This project aims at pursuing academic excellence and at encouraging cooperation between academic and Chinese language teaching circles with NSC resources in hope of promoting Taiwan into an important base of Chinese as Second Language (CSL). These include the solicitation of CSL teaching methods and teaching models, learning portfolio research, digital Chinese teaching model development and experiment, research on special topics in learning Chinese as Second Language, and the development of Chinese language tools.

(V) Promoting Chinese Language Learning Worldwide with NPM Cultural Resources

Under the "A Community Portal for Museum-School Collaboration: Applications of Cultural Resources on Chinese Language Learning" project, the National Palace Museum compiles and edits digital content for Chinese language teaching and cultural education by analyzing and utilizing existing publications of TELDAP with its abundant cultural resources. Also, a community portal for museum-school collaboration is established to enhance the international exposure of Taiwan's e-Learning (digital education) for Chinese language.

(VI) Promoting the Globalization of Hakka Dialect to Display Taiwan Features

CHA provides various Hakka dialect e-Learning mechanisms and has established a Web-based Hakka Culture College for Global Chinese (Hakka Internet College) for online learning of the Hakka dialect and culture. CHA also offers online courses and holds academic symposia on the Hakka dialect and culture.

By establishing a collaborative mechanism across ministries and commissions and concentrating the government's energy for drawing up policies on Chinese language e-Learning technology, it is hoped that these six strategies can effectively realize the vision of "establishing Taiwan's international status and brand value in e-Learning for Chinese language".

5.2 Digital Teaching Capability Training Plan for Personnel Who Teaching Chinese as Second Language

I. Promotional Strategies and Action Plans

Considering the enormous global need of Chinese language teachers, the MOE has strengthened the measures for training and dispatching professional Chinese language teachers in recent years. The focus in the beginning is to dispatch Chinese language teachers to North America to instruct CLS students in high schools or of higher levels by proposing the following three promotional strategies: (1) to foster the basic and advanced e-Learning application capabilities of Chinese language teachers; (2) to build a teaching resource platform for Chinese language teachers at home and abroad; and (3) to develop a mechanism for exchanging and sharing e-Learning courseware of Chinese language.

The MOE has drawn six action plans to smoothly promote the above three strategies: (1) to establish indicators for assessing the digital teaching capability of Chinese language; (2) to organize Chinese language teacher training programs; (3) to develop e-Learning courseware for Chinese language and to combine teaching resources of different circles; (4) to enrich the content of the Chinese language teaching resource platform; (5) to indicate CC licensing (Creative Commons) for promoting resource sharing and application; and (6) to promote e-Learning courseware accreditation.

II. Projected Benefits

(I) Qualitative Benefits

Firstly, it is to develop the digital teaching capability of Chinese language teachers to let them understand the concepts, methods, and latest trends in e-Learning. It is to equip them with the ability to apply e-Learning and courseware in Chinese language teaching in order to improve digital teaching skills of teachers interested in teaching Chinese language and thereby to enter the international Chinese language market. Secondly, brands featuring Taiwanese ways of learning for Chinese learning products and services should be established to let major markets in the world understand the advantage of the digital Chinese learning products and services from Taiwan.

(II) Quantitative Benefits

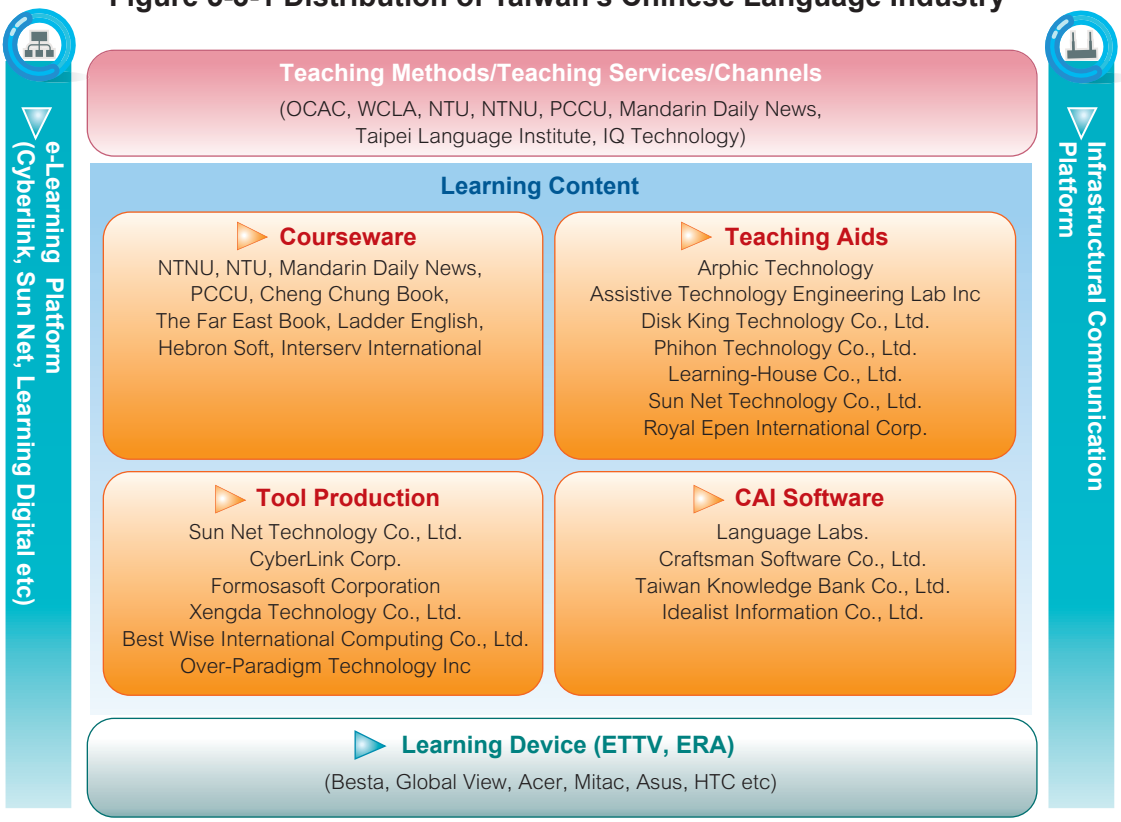
Firstly, 300 Chinese language teachers are to be trained every year to enhance the digital teaching ability of Taiwanese Chinese language teachers in the short run; and to foster teachers with courseware development and online leadership ability in the long run. Secondly, Chinese language e-Learning courseware of 30 hours is to be developed and produced every year. It will be provided for teaching uses through CC licensing (Creative Commons public licensing terms) to integrate with existing Chinese language teaching materials of about 200 hours from other domestic units as it continually enriches the digital content of Chinese language. Lastly, a Chinese language teaching resource platform and e-Learning blog are to be established to encourage Chinese language teachers to browse and exchange their experiences with a targeted viewer count over 10,000 people.

5.3 Chinese e-Learning Industry Promoting Subsidiary Program

I. Promotional Strategies and Action Plans

By continually promoting the area of Chinese language learning in the TELDAP, Taiwan has developed various Chinese learning products and learning models, covering teaching methods, teaching services, e-Learning courseware, and learning platforms and devices to meet the needs of different markets across the world. Through mutual cooperation with businesses, a value chain of the Chinese language e-Learning industry has been formed (Figure 5-3-1).

Figure 5-3-1 Distribution of Taiwan's Chinese Language Industry



With Taiwan's advantages in IT-communication industry and as a Chinese-speaking country, the IDB plans to effectively import Taiwan's Chinese language e-Learning industry into the value chain of the global Chinese language learning industry, and thereby to transform Taiwan into the world's logistics center for Chinese language through three strategies: local operations of Digital Huayu e-Learning Center; collaborative development through international cooperation; and global services for distributing Taiwanese products of excellence through virtual and physical communities.

The IDB realizes the vision of transforming Taiwan into the world's logistics center for Chinese language through the following three action plans..

(I) Local Operation Plan—Digital Huayu e-Learning Center Model

The IDB will launch cooperation with worldwide organizations interested in the Chinese language learning business in order to establish fifty demonstration locations with operating performance in ten countries within the next five years. Also, the OCAC has implemented e-Learning to cultural and educational centers or Chinese schools across the world since 2007 to provide overseas Chinese with bases of modern learning and service. The IDB will assist learning centers with business operation opportunities to implement products and services from Taiwan's Chinese language industry.

(II) International Channel Cooperation—Collaborative Development Model

Given that Taiwan is the first option for overseas businesses to seek suppliers of Chinese language teaching resources, the IDB thus plans to promote a collaborative development model for developing digital courseware or learning platforms through cooperation with CSL learning institutions overseas and market channels. Effective international cooperation will facilitate Taiwan in entering the supply chain of the global Chinese language industry.

(III) Global Business Partner Service Plan—Virtual and Tangible Community Services for Distributing Taiwanese Products of Excellence

In addition to voluntarily participate in overseas exhibitions to display Taiwan's high-quality Chinese language e-Learning products, the IDB has invited leading learning organizations and Chinese language learning organizations to visit Taiwan in order to develop future partnership. In virtual community operations, the IDB assists businesses to run Chinese language learning websites and e-marketplaces with the open source Modular Object-Oriented Dynamic Learning Environment (MOODLE).

II. Projected Benefits

In addition to the quantitative goals, the benefits of promoting the Chinese language e-Learning industry contain qualitative benefits in channel and culture. The qualitative and quantitative indicators of these benefits are as follows.

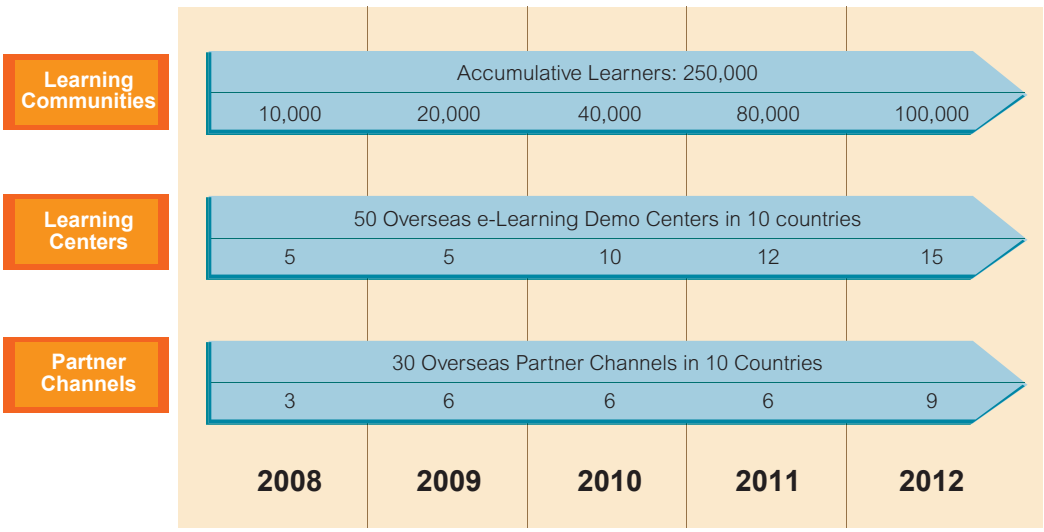
(I) Qualitative Benefits

Based on the vision of "Logistics Center for Global Chinese Language Resources", the IDB can not only establish Taiwan's brand of quality Chinese language teaching products and expand the overseas Chinese language market, but also enhance Taiwan's international influence.

(II) Quantitative Benefits

The IDB will establish fifty overseas e-Learning demonstration centers in ten countries within the next five years, align thirty overseas channels, and increase the population of learning communities to 250,000 of partnership Chinese language learning platforms (Figure 5-3-2). These establishments are expected to attain the core output value of NT$5 billion and peripheral output value of NT$15 billion.

Figure 5-3-2 Targets of Chinese e-Learning Industry Promoting Subsidiary Program for 2008-2012



5.4 Huayu e-Learning Program for Overseas Chinese

I. Promotional Strategies and Action Plans

The OCAC has been promoting Chinese language learning to overseas Chinese over time and has maintained close cooperation with over 1,500 schools for overseas Chinese and cultural and education organizations overseas, thus accumulating rich overseas Chinese school resources and overseas Chinese teaching experience. Huayu e-Learning Program for Overseas Chinese is an example of applying Taiwan's lively and vivid Chinese language teaching methods, as shown in Table 5-4-1, in the leading, free and democratic learning atmosphere.

Table 5-4-1 Strategies of the Huayu e-Learning Program for Overseas Chinese

Item	Approach	Objective
1	To promote Traditional Chinese and Taiwan's quality Chinese language educational resources.	To enhance the exposure of Taiwan's educational resources
2	To consolidate the relations with overseas Chinese schools; to improve the Chinese language e-Learning capability of overseas Chinese school teachers, and to provide multiplicity Chinese language learning channels.	To display the influence of overseas Chinese on leading educational institutions.
3	To provide the descendents of overseas Chinese with a human and user-friendly e-Learning environment and comprehensive resources for Chinese language.	To expand the overseas territory of Chinese language learning, and to reshape the new contour of overseas Chinese schools.

Source: OCAC

The following plans are drawn up for achieving the above strategies.

(I) Continual Maintenance, Operation and Enrichment of the e-Learning Huayu of Taiwan Website

Completed in 2008, the e-Learning Huayu of Taiwan is a platform composed of four major sections:

community, school, yellow page and product, for Chinese learning communities to share experience and exchange information.

(II) Continual Implementation of Digital Huayu e-Learning Center

The Digital Huayu e-Learning Center is constructed from the existing Chinese language teaching hardware and software infrastructures of overseas Chinese schools and cultural and educational centers overseas. These centers are endowed with the functions of Chinese language teaching, consultation service, teacher training, cultural exchange, and courseware display. By combining with the features from the e-Learning Huayu of Taiwan Website, they become the best practice of demonstrating Chinese language e-Learning, and realize the global expansion of Taiwan's quality Chinese language teaching through overseas Chinese schools.

(III) Facilitating Training and Promotion of Chinese Language e-Learning by Reinforcing International Publicity

To enthusiastically promote Traditional Chinese and Taiwan's quality Chinese language education; to organize and promote teacher training programs by combining the virtual e-Learning Huayu of Taiwan and the physical Digital Huayu e-Learning Center to enhance the digital competence of global Chinese language teachers.

II. Projected Benefits

To promote Chinese language e-Learning to overseas Chinese by improving the capacity of overseas Chinese schools in applying Chinese language e-Learning. The qualitative and quantitative indicators are as follows.

(I) Qualitative Benefits

To combine the multimedia, online interactive courseware and physical courses is offered by the e-Learning Huayu of Taiwan, while to assess and enrich the software and hardware equipment is required by Digital Huayu e-Learning Center in order to enhance the quality of teaching services. To boost the development of Chinese language learning industry to enhance Taiwan's e-Learning international competitiveness.

(II) Quantitative Benefits

To continually select and implement 50 Digital Huayu e-Learning Centers across the world by 2011; to organize synchronous and non-synchronous courses on the e-Learning Huayu of Taiwan in cooperation

with domestic and overseas teaching institutions and Chinese language scholars and experts; to train 300 seed-teachers worldwide for e-Learning Huayu of Taiwan every year; to organize at least 10 overseas training and promotional activities for e-Learning Huayu of Taiwan every year.

5.5 Chinese as a Second Language e-Learning Research

Given that CSL (Chinese as a Second Language) or CFL (Chinese as a Foreign Language) learners may come from different cultures, speak different languages, be of different ages and learning conditions, it is necessary to investigate the learning mechanisms and barriers of learners in a multilingual construct as a reference for teaching and developing the Chinese-language-related industries through cooperation among the industry, government and academic circles in order to favor Taiwan's transformation into the center of fundamental and pedagogic research of Chinese language.

I. Action Plans

The CSL e-Learning research can be conducted in two stages to achieve the program objectives. It is to form interdisciplinary and multinational R&D teams, while organizing international symposia.

(I) Formation of an Interdisciplinary and Multinational R&D Team

Since the Chinese writing system is different from most writing systems of the world, the learning portfolio of Chinese language for CSL and CFL learners is different from the acquisition of native Chinese speakers. Therefore, the NSC began requesting excellent interdisciplinary and multinational R&D teams and proposals in February 2008 to promote the scientific study of Chinese language learning; and began funding outstanding R&D teams in August 2008 to engage in the fundamental research and development of relevant educational industries.

A R&D team must be formed by experts from different fields, including experienced Chinese language teachers and researchers, scholars, specialists in e-Learning and the R&D of digital content, and psychologists (specialists in instructional psychology and psychological measurement. Suggested R&D contents include (1) language learning componential analysis; (2) overall learning portfolio analysis; (3) cross-linguistic cognition of bilingual speakers; and (4) digital learning portfolio investigation.

Additionally, different teaching models with evidence based experiments shall be developed for learners from specific groups and with learning conditions for various e-Learning situations, such as multimedia-assisted instruction, online and blended teaching, or digital agent assisted instruction; and appropriate courseware shall be provided. Therefore, the design and development of Chinese language e-Learning courseware and teaching methods shall specify: (1) learner characteristics; (2) professional courseware

area; (3) learning level; and (4) teaching focus. Also, the courseware design must include complete course subject and learning framework integrated to instructional strategies, assessment and teaching aids.

Special learning strategies or tools shall be developed for CSL learners including learning Traditional Chinese characters from Simplified Chinese characters, the identification and learning of the four tones in Mandarin, and vocabulary learning strategies, to help students to acquire a large amount of vocabulary within a short period of time to facilitate reading. Also, Chinese language learning tools shall be developed based on Taiwan's electronic product manufacturing advantage, such as electronic dictionary, to improve self-learning.

(II) Organization of International Symposia

International symposia shall be held for R&D teams to exchange the research results and display learning products developed for international academic and industrial counterparts.

II. Projected Benefits

The projected benefits and indicators for 2008-2012 are summarized as follows:

(I) CSL (CFL) Learning Research: 20 journal papers on promoting CSL published internationally.

(II) Development and Experiment of Chinese Language e-Learning Models: 20 TCSL (Teaching Chinese as a Second Language) projects with results published internationally.

(III) Cooperative Education Promotion: 24 projects on special topics in CSL and the R&D of CSL e-Learning products, including 12 CSL research projects and 12 CSL e-Learning product R&D projects. Learning Tool Development: 12 Chinese language learning tool R&D projects published internationally.

(IV) Five International Symposia

5.6 Community Portal for Museum-School Collaboration

I. Promotional Strategies and Action Plans

The National Palace Museum (NPM) plans to implement the project A Community Portal for Museum-School Collaboration: Applications of Cultural Resources on Chinese Language Learning starting from 2009. The focus of the project is to align museums, researchers, school teachers and professionals in different fields for collaborative research and development in terms of a community for museum-school collaboration.

Domestically, the NPM has been developing comprehensive and multidimensional media in recent years, such as the NMP e-Learning (http://elearning.npm.gov.tw/), and Digital Museum (http://www.npm.gov.tw/zh-tw/collection/theme_01.htm). The NPM has also been promoting e-Learning application across Taiwan by advancing museum-school collaborative e-Learning demonstration centers at elementary and junior high schools for the R&D of teaching innovation.

Internationally, the NMP has participated in the annual congress of the American Council on the Teaching of Foreign Languages (ACTFL) in 2006 and 2007 to display e-Learning courseware, and has also displayed digital multimedia works in Irvine, California; and New York in May 2007 and later in other places. Since September 2007, the NPM organized the Window of Taiwan at the Taipei Cultural Center in Washington DC and offered learning visits to NMP to local Chinese schools and leading high schools.

The following action plans are thus drawn to achieve the above strategies.

(I) System Implementation of Community Portal for Museum-School Collaboration

The Community Portal for Museum-School Collaboration system shall be implemented with reference to Web 2.0 to provide museum (archive center) personnel, experts and scholars, teachers, and students with a platform for collaborative reading, learning, discussing and sharing.

(II) Development of Chinese Language e-Learning Content with Cultural Resources

Firstly, publications from TELDAP will be analyzed and edited into digital contents (courseware) appropriate for cultural education and Chinese language learning. Museum-school collaboration will be initiated by

museum personnel and teachers of all levels for overseas teachers to use in Chinese language learning.

Secondly, web creators will develop e-Learning resources with teaching materials, such as introduction to museum collections in terms of prior learning knowledge (in webpage format) and online courseware (in article format) linking to extended readings (online interactive multimedia format).

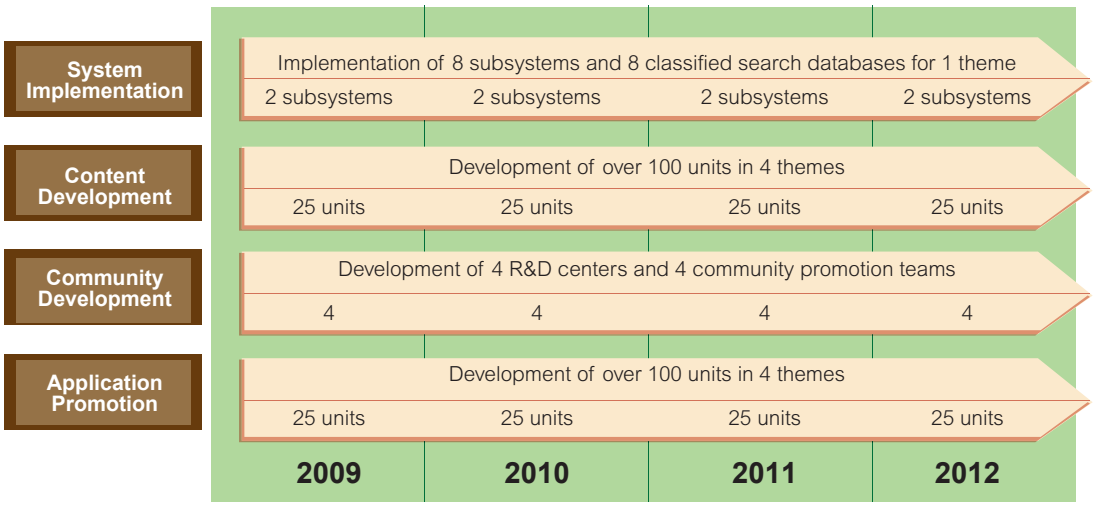
(III) Promotion of Museum-School Collaboration e-Learning Practice and Application

A Museum-School Collaboration e-Learning R&D Center will be established in Taiwan to combine worldwide volunteer or contract workers to give R&D community workshops on a regular basis based on division of labor. A Teaching Community Promotion Team will be formed in different parts of the world to organize output announcement symposia and assist seeded teachers to implement e-Learning resources to teaching.

II. Projected Benefits

The NPM will implement the project based on the following four aspects: system implementation, content development, community development, and application promotion. Complementary benefits will be obtained from this mid-term project (Figure 5-6-1).

Figure 5-6-1: Projected Benefits of Community Portal for Museum-School Collaboration Project



It is projected that the Community Portal for Museum-School Collaboration project can encourage teachers at home and abroad to form an organized, international courseware R&D and application team through interconnection over the community portal. The community portal can also facilitate the promotion of museum-school collaboration e-Learning activities for teachers and students to read and discuss together in e-Learning. The results of the project can provide endless e-Learning resources.

5.7 e-Learning Plan of Hakka Language and Culture for Global Chinese

I. Promotional Strategies and Action Plans

In light of the crisis in passing on the Hakka dialect , the Council for Hakka Affairs (CHA), Executive Yuan, thus launched the e-Learning Plan of Hakka Language and Culture for Global Chinese and participated in the National Science and Technology Program for e-Learning hosted by the National Science Council (NSC) in 2005 to promote the establishment of the Hakka Culture e-Learning Center for Global Chinese. The CHA hopes to systemically accumulate, while implementing, Hakka courseware, databank, and dialect web-based courses to form the community for Hakka language and culture learning. The e-Learning Plan of Hakka Language and Culture for Global Chinese plans to achieve the following goals: (1) to maintain the operation of Hakka Culture e-Learning Center for Global Chinese; (2) to produce e-Learning courseware on Hakka dialect and culture; (3) to develop online GBL games for learning Hakka dialect and culture; and (4) to organize training and promotional activities for learning Hakka dialect and culture.

The following action plans are drawn for obtaining the objectives above.

(I) Establishing the Hakka Culture e-Learning Center for Global Chinese

The Hakka e-Learning Center(Figure 5-7-1 http://elearning.hakka.gov.tw/) that was completed in 2004 has devised an online game story plan, a college and university teacher cooperation project, marketing plan, and a personnel service web with two-way and cross-domain single sign on functions. The Taiwan Hakka Vocabulary Database, a system with resemblance to Wikipedia, was also developed for scholars and experts of Hakka background to supply data on Hakka vocabulary. This will help enhance the coherence of Hakka community and to transform Taiwan into the Hakka cultural center of the world.

(II) Promoting Hakka Culture with Multidimensional Learning Contents

This is to develop and provide multidimensional e-Learning courses and courseware on Hakka dialect and culture for the public with specialized courses for children and adolescents. This will also integrate resources related to Hakka dialect and culture and encourage the academia, businesses and cultural institutions to collaboratively develop e-Learning courseware and activities for Hakka dialect and culture. In order to provide multidimensional channels for learning the Hakka dialect, there will be development

of mobile interactive courseware by means of mobile technology and mobile learning strategies. Then, in accordance with the Hakka language proficiency exams for elementary, intermediate, and advanced levels, certificates for credits of higher education will be issued and a credit transfer policy introduced for credits obtained from e-Learning courses. This will encourage the utilization of e-Learning platforms for higher education.

(III) Developing Online RPG (Role-playing Games) to Attract Young Learners to Learn Hakka Dialect

To attract young learners of Hakka, there will be development of online RPG based on Liutui Hakka cultural history as to combine Hakka tradition, history, culture and dialect teaching with the needs of modern young learners. In this RPG with Hakka elements, learners will acquire Hakka dialect pronunciation along with a sense for Hakka culture.

(IV) Organizing Promotional Activities, Training Hakka Professionals, and Marketing Hakka Culture

This is to continue organizing the Hakka Dialect and Culture Multimedia Teaching and Production Camp to provide training for teachers of all levels and the public interested in promoting Hakka dialect and culture. By encouraging trained teachers in primary and secondary schools to use e-Learning courseware and the database system, this plan hopes not only to popularize Hakka dialect and culture but also to pass on Hakka dialect and culture to younger generations. Teachers will be responsible for holding festivals, enhancing website contents for Hakka learners, and organizing Hakka dialect online game tournaments as ways to market Hakka culture.

II. Projected Benefits

The qualitative and quantitative projected benefits of the project are as follows:

(I) Qualitative Benefits

This is: to enhance the pedagogic aptitude and e-Learning courseware production ability of teachers with tangible and e-Learning courses; to train professionals through higher educational courses and programs as to attract more scholars to engage in or concern about issues in this area.

This is also: to produce e-Learning courseware and content on Hakka culture to advance the technology and increase job opportunities of the digital content industries; to provide people interested in Hakka culture with relevant guiding resources over the Internet and combine the on-line courses and related

digital contents with actual tours (with specialties, snacks, traditional art, travel, etc.) and expand local opportunities in turn.

Lastly, this is: to increase opportunities for the public to have contact with Hakka culture over the Internet; to promote respect and fusion among ethnic groups through the understanding of Hakka culture. This year, Hakka online RPG are developed to facilitate people in learning Hakka dialect and culture and to boost a trend for Hakka.

(II) Quantitative Benefits

In terms of enhancing national competitiveness with e-Learning, at least 30 tangible and e-Learning courses will be organized a year to train seeded teachers of Hakka dialect. Assistance will be given to teaching staff of higher education or community universities to design courseware on Hakka dialect and culture for at least 80 hours with this e-Learning platform. This will improve teachers' ability in producing and applying Hakka dialect courseware.

In terms of promoting Taiwan's e-Learning industry development, this program can help introduce technologies for e-Learning platforms and production tools, develop and produce the Taiwan Hakka Vocabulary Database, and create at least 20 hours of e-Learning courseware a year; and the amount of relevant digital contents is on a yearly increase. Quality CHA publications and Hakka TV programs will be selected for producing at least 100 hours of e-Learning courseware to increase and diversify Hakka e-Learning.

In terms of improving social benefits with e-Learning, a total of 10,000 sets of e-Learning DVDs and 10,000 pamphlets will be produced for marketing and promotion. It is projected that this can provide job opportunities for digital content design and attract at least 10,000 learners to enroll to this e-Learning program.

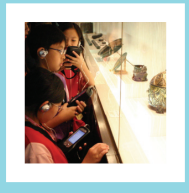
5.8 Conclusion

This project promotes Chinese language teaching and cultural education overseas by combining major academic research and leading industries in Taiwan and by integrating the achievements from TELDAP Phase I and NPM resources. Considering the enormous global demand of Chinese language teachers, ministries and commissions participating in the program will strengthen policies concerning the training and delegation of professional Chinese language teachers. These include the building of platforms for Chinese language teachers and teaching resources at home and abroad, fostering the fundamental and advanced e-Learning application abilities of Chinese language teachers, and developing quality e-Learning courseware. The OCAC also provides overseas Chinese schools and cultural and educational institutions with close guidance for transforming them into multifunctional overseas Digital Huayu e-Learning Centers for the spreading of the Chinese language and culture of Taiwan.

The IDB assists industries to develop Chinese language e-Learning businesses in order to import Taiwan's Chinese language e-Learning industry to the value-added chain of the world Chinese language industry. The IDB expects to transform Taiwan into the global logistics center of Chinese language. With multimedia technology, CHA develops and produces multidimensional, comprehensive and vivid e-Learning courses by combining online games to pioneer the trend of e-Learning for Hakka dialect and culture in the world.

With this program, it is hoped that Chinese language teachers are equipped with e-Learning skills and that the amount of suppliers of Chinese language learning products increases in order to promote the development of Taiwan's quality Chinese language e-Learning industry. Additionally, with the e-Learning websites, e-Learning courses, training courses, e-Learning centers established by sub-projects, it is hoped that the amount of people learning Chinese language across the world increases every year in order to create high industrial value.

It is believed that by promoting this program, we can develop Taiwan into a quality brand of Chinese language e-Learning. This way, in addition to expanding the overseas Chinese language market and increasing language, culture, and technology related job opportunities at home and abroad, the program can enhance Taiwan's international influence by expanding the effects of Taiwan's soft power.



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Part 2

Accomplishments of the e-Learning National Program (2003 ~2007)

Chapter 1
Summary of the e-Learning National Program

To expand learning opportunities for the Taiwanese people, boost national competitiveness and develop the e-Learning industry, between 2003 and 2007 the government launched the five-year National Science and Technology Program for e-Learning (ELNP) between 2003 and 2007. The ELNP had three components: "Deployment", "Industry and Application" and "Research and Development".

The importance of e-Learning was recognized by many government departments and they elected to join in the ELNP. These included the "Central Personnel Administration", the "Ministry of Education", the "Council of Labor Affairs", the "Overseas Compatriot Affairs Commission", the "Council for Cultural Affairs", the "National Palace Museum", the "Department of Health", the "Council for Hakka Affairs" and the "Council of Indigenous Peoples Affairs".

Of these government departments, the Central Personnel Administration made promoting the use of e-Learning by civil servants in Taiwan its goal. It not only combined the e-Learning resources of different government departments under a unified login mechanism but also devoted itself to cultivating e-Learning expertise in government departments. At the Ministry of Education, the Computer Center was responsible for promoting the training of e-Learning cadre, producing high-quality digital courseware and bridging the digital divide between the city and the countryside through e-Learning. The Council of Labor Affairs opted to set up a "e-Learning Website of Labor" website. The website has used e-Learning to improve laborer skills and safety while also helping labors acquire professional technical certification.

Apart from the above, the Overseas Compatriot Affairs Commission actively sought to establish Chinese e-Learning demonstration centers in overseas and use e-Learning to conduct Chinese language education; at the same time, "e-Learning Huayu of Taiwan" website was set up to provide high-quality Chinese e-Learning courseware and services. The Council for Cultural Affairs was also busy with promoting an online

cultural policy, community building, development of creative cultural enterprise and using e-Learning to preserve Taiwan's culture, citizen aesthetics and cultural assets. The National Palace Museum also digitized the treasures in its collection then used them to develop e-Learning courses. This provided locals and foreigners with the opportunity to learn about history and antique relics, and in turn, the roots and changes of Chinese culture.

The Department of Health, on the other hand, commissioned experts to develop e-Learning courses on topics such as the 13 most common major diseases or sudden infections experienced by the Taiwanese. Through teaching people about this disease prevention, treatment and health care, the effort was determined to reduce the frequency of severe diseases. The Council for Cultural Affairs chose to set up an online Hakka e-school for preserving Hakka history, language and culture. Using the website, local and foreign users can learn about Hakka and take the certification tests online. As for the Council of Indigenous Peoples Affairs, e-Learning courses were offered through the Taiwanese Indigenous Peoples Digital Learning Center and the Indigenous Peoples Children's Education Network. These supported the preservation of Indigenous Peoples language, history and culture.

In the "Industry and Application", the experience from the successful development of Taiwan's IT industry was used to advise and encourage domestic enterprises to introduce e-Learning and boost their competitiveness. The resultant demand will help realize the goal of cultivating an e-Learning industry. Due to local enterprises' repeated use and testing of products and services, the e-Learning industry was able to improve and grow. It now has built up the strength to challenge the global market and seek out international orders.

As for "Research and Development", a collaboration between the National Science Council and the MOEA Department of Industrial Technology focused research attention on development of digital content and study of e-Learning. An outstanding trans-disciplinary research team was also formed and the relevant dissertations published in international journals, boosting Taiwan's R&D profile in e-Learning research. On the other hand, the hosting of an industry-academia forum and setting up for industry-academia matchmaking platforms serve to create an industry-academia matchmaking platform that will help encourage two companies to work together and boost the results of research accomplishments.

Described in the following sections are the results from the three sub-projects: "Deployment", "Industry and Application" and "Research and Development".

Chapter 2
Achievements in Promoting e-Learning at Government Departments

The National Science & Technology Program for Learning (ELNP) has, after five years of implementation, achieved significant progress in improving e-Learning opportunities for the general population. The achievements of the government departments will be described in detail below.

2.1 Achievements in Promoting e-Learning for the Civil Service

The Central Personnel Administration (CPA) of the Executive Yuan did not take part in the ELNP Phase I (2003~2007) but as the Executive Yuan's staff agency for human resources development, the CPA actively promoted e-Learning for the civil service. A variety of supporting initiatives were implemented, including the defining of implementation timetables, boosting promotional efforts, unified login for learning websites, coordinating the development quality courses, training of e-Learning cadre and setting the minimum of hours of e-Learning.

I. Program Summary

(I) Policy Planning

To promote e-Learning, the CPA defined the implementation timetable and steps (Table 2-1-1) as a

reference for government departments (agencies). Guidelines for measuring the results of e-Learning were also established as a basis for registering the number of hours devoted to lifelong education by civil servants. The CPA increased the minimum time of lifelong learning per civil servant from 30 to 40 hours. These must include at least five hours of e-Learning and 20 hours of professional learning. The CPA is also actively pushing for inclusion in the ELNP Phase II to increase the effectiveness of its e-Learning promotion efforts.

Table 2-1-1 "e-Learning Project for the Civil Servants of Executive Yuan" Timetable and Phases

Implementation Timetable	Introduction Phase	Development Phase	Promotion Phase
Implementation Time	May 24, 2006~May 23, 2009 (3 Years)	May 24, 2009~May 23, 2014 (5 Years)	May 24, 2006~May 23, 2009 (3 Years)
Formal Education	1. Convene e-Learning Study Group meetings 2. Improve e-Learning resource notification mechanism 3. Improve quality of IT equipment and specialist personnel 4. Improve promotional efforts 5. Set up one single login entry for government departments' learning websites	1. Set up a quality e-Learning environment 2. Coordinate the development of quality e-Learning courses and set up a comprehensive learning performance evaluation mechanism 3. Expand the promotion of blended learning formats 4. Provide e-Learning advice and develop personnel training content 5. Set the minimum number of e-Learning hours per year	1. Promote the use of a government e-Learning course certification mechanism 2. Set up a mechanism that integrates e-Learning with civil servants' core competencies 3. Set up a benchmark e-Learning model and publicize e-Learning achievements 4. Incorporate "ELNP" research results to effectively magnify the results of value-added e-Learning

Source: CPA

(II) Practical Implementation

To improve the notification of e-Learning resources, the CPA added an "e-Learning Resource Notification" function to the back-end of the Lifelong Learning Information Portal for Civil servants. Apart from bringing the existing government department e-Learning resources all under one roof, the CPA also actively

promoted one single login entry for the learning websites to make the channels for learning for accessible. At the same time, the CPA liaised with training organizations to set up e-Learning cadre courses and online promotion courses. Regular e-Learning symposiums and international exchanges were also held as well.

II. Program Benefits

(I) Qualitative Benefits

In terms of the program's qualitative benefits, as e-Learning is not restricted by time, space or location, it not only reduces government training costs by allowing effective learning at any time and any place but also allows the learning activities to transcend national boundaries as well. This encourages interest in learning and the participation of private-sector businesses.

(II) Quantitative Benefits

In terms of quantitative benefits, the program has gradually increased acceptance of e-Learning among civil servants . Statistics from the portal website indicate that in 2006, the average number of learning hours per civil servant at the Executive Yuan and its subordinate agencies was 89.31 hours. Of these, e-Learning hours (including blended learning) accounted for 3.82 hours or 4%; in 2007, the average number of learning hours per civil servant was 97.77 hours, with e-Learning (including blended learning) hours accounting for up to 7.2 hours or 8%. This showed a clear increase in the number and proportion of e-Learning hours, reflecting a greater acceptance of e-Learning among government departments and civil servants .

9 learning websites have now joined one single integrated scheme as of December, 2007. The ELNP e-Learning Quality Certification Center has so far approved 32 e-Learning courses developed and produced by government departments (Note: A total of 75 public and private-sector developed e-Learning courses have been approved so far) with 14 receiving Level A certification and 18 receiving Level AA certification. This suggests that a certain standard of quality has now been achieved in the development of e-Learning materials. (There are three levels of quality certification for e-Learning courseware and e-Learning services: Level A, Level AA and Level AAA. Level A means certification was approved.)

2.2 Achievements in Promoting e-Learning in Schools at All Levels

The development of the Internet means learning may now take place outside of the classroom. In response to this trend, the tertiary education system in Taiwan has begun offering e-Learning courses for credited courses and also in-service degree programs. For primary and secondary education its main application has been in-service training for teachers.

I. Program Summary

(I) e-Learning at Universities and Colleges

The accreditation requirements for e-Learning credits and degrees were relaxed so each school could develop the most effective e-Learning courses for the school and students based on their own unique characteristics and requirements. At the same time, different types of training courses were organized to enhance tertiary education facilities' planning and development of e-Learning project personnel as well as their course development, teaching and teaching design skills.

(II) Integration of ICT Education in Teaching at Primary and Secondary Schools

Apart from assisting primary and secondary schools with the development of ICT education infrastructure and demonstration sites for regional e-Learning environments, the Ministry of Education (MOE) also provided grants to local education bureaus for improving teacher quality by holding training workshops and learning seminars. Other initiatives include incorporating all kinds of information resources into the MOE's teaching websites to provide teachers with rich resources to use.

II. Program Benefits

(I) Qualitative Benefits

In terms of qualitative benefits, e-Learning in-service master's programs were trialed to provide a more flexible alternative channel for acquiring degrees. An e-Learning certification system was also implemented to increase acceptance of e-Learning courses among the public. Sharing of e-Learning teaching resources was also encouraged through the introduction of e-Learning demonstration models and the creation of

resource sharing and exchange platforms in order to boost learning effectiveness.

For teachers in rural areas or on offshore islands, in-service e-Learning helped to reduce the need for substitute teachers and transportation difficulties. Volunteers from universities were also encouraged to provide children in remote rural areas with remote mentoring over the Internet to help bridge the learning divide between the city and the countryside. Primary and secondary schools were also encouraged to take part in international online learning and networking activities to expand the students' international perspectives.

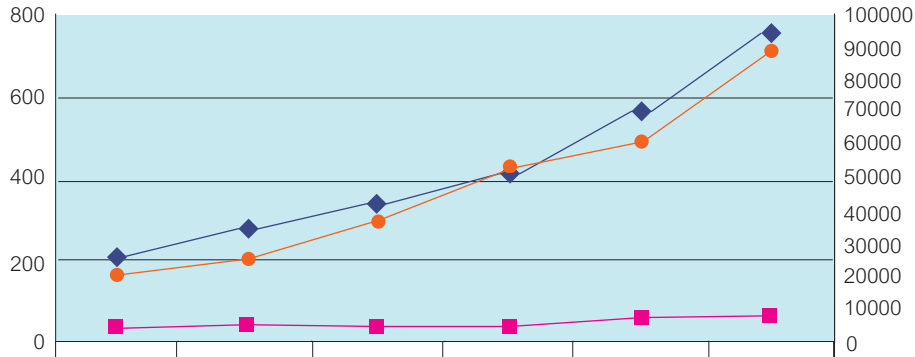
(II) Quantitative Benefits

For tertiary education, distance education guidelines were set for technical school and above. The crediting requirements for distance education were also relaxed from 1/3 of all program credits required for graduation to 1/2. For certain tertiary disciplines, trials were also held for online in-service master's degree programs. So far, three schools and five master's in-service degree program trials have been approved. At the same time, certification of e-Learning courses and teaching materials were also introduced at the tertiary level. 40 courses and 7 sets of teaching materials have passed the certification process. Based on the e-Learning course reports submitted by colleges and universities, e-Learning has now been introduced by over 60 local schools in the last 3 years. More than 2,500 credited courses have accumulated over this time and nearly 300,000 people in total have enrolled to date (Figure 2-2-1).

As for primary and secondary schools, MOE held workshops of ICT expertise and information integrated into teaching. By 2007, a total of 650,000 workshop places have been held, with over 35% of primary and secondary teachers taking part in ICT training. The MOE also developed a union catalog resources sharing platform – the "Educational Resources website (EtoE), over 37,865 teaching resources are now available; there is also the "Learning Fueling Station" that organizes module resources for "Grade 1-9 curriculum" and has so far incorporated 6,295 pieces of information from a variety of different disciplines into teaching resources.

Today, 99.7% of all primary and secondary students have used a computer (according to June 2006 survey conducted by the Research, Development and Evaluation Commission (RDEC), Executive Yuan). On average, 82.5% of primary and secondary school students have a computer in their home (according to November 2007 survey conducted by the MOE) and these all help to narrow the IT divide between city and countryside. Additionally, active efforts are being made to promote online mentoring services for students in remote areas. As of December 2007, 135 students and 98 volunteer mentors have taken part in the program resulting in a total of 5,800 mentoring hours. At the same time, students were encouraged to take part in international ICT competitions and in 2007 Taiwan won 2 golds, 1 silver and 1 bronze medals at the International Olympiad in Informatics.

Figure 2-2-1 Number of e-Learning Courses Opened by Tertiary Education Institutions, 2005~2007



Academic Year	2001	2002	2003	2004	2005	2006
No. of Schools	38	44	42	48	59	68
No. of Courses	206	277	333	406	554	757
No. of Students	21,678	26,288	37,560	53,148	61,870	88,845

Source: MOE

2.3 Achievements in Promoting e-Learning for Labors

To boost the competitiveness of Taiwanese labors, the Council of Labor Affairs (CLA) of the Executive Yuan proposed the "e-Learning Projects for Labors" in support of the "Challenge 2008" with participation in Taiwan e-Learning Program based on its own policy initiatives and budget. The program's content and achievements are summarized below:

I. Program Summary

To provide Taiwanese labors, businesses and labor unions with a learning environment free from the constraints of time and space, the CLA established the "e-Learning Website of Labor" to provide not only information on labor rights related laws and policies but also online e-Learning courses such as the 2-hour online training and certification program for general safety & health education that corporate members have full access to. The website also offers online learning assistance as well as blended teaching and online seminars to reduce training costs for business units. Additionally, the website has set up a labor education area where every course includes online tests or detailed course-end summaries that students can use to measure their own learning progress.

The CLA also distributes learning coupons to labors with no computer experience to improve their computer skills. A skill certification service with online test and immediate marking of academic subject test is also being developed by the CLA. The setting up of more testing venues and the provision of past exam questions in the electronic format will see traditional written exams replaced by online testing. At the same time, a "Vocational Training e-Learning Website " has been set up as a joint effort between the training centers operated by the CLA's Bureau of Employment and Vocational Training to co-develop vocational training courses.

II. Program Benefits

(I) Providing Labors with a Lifelong Learning Resource

As of December, 2007, the e-Learning website of labor has developed a total of 111 courses in 15 categories, hosted 73 training sessions, registered 37,034 individual members and 711 corporate members (with around 260,000 employees in total) and viewed by 296,646 people. 4,476 people has been certified through the 2-hour online general safety & health education training course as well, making

it an important channel for learning about new developments in labor rights.

(II) Reducing Occupational Injuries through Labor Education

The Institute of Occupational Safety & Health (IOSH) provides a total of 71 safety & health related courses. 6 of these are placed on the IOSH website for children so they can learn about proper safety & health concepts through play and introduce labor safety & health education at an early age.

(III) Reducing the Thresholds for Employment and Expand Online Test and Immediate Marking of Academic Subject Test Services

In 2003, 117 training units were approved for the use of "learning coupons". There were 77 in 2004, 100 in 2005, 99 in 2006 and 92 in 2007. These units set up e-Learning channels at the community level and provided assistance to 70,513 job seekers and unemployed workers. The effort improved labors' IT skills and improved their employability. An increasing number of occupations have now been added to the online test and immediate marking of academic subject test service network's database of skill certification over the years and online practice tests made available. The database now covers 118 occupations and more than 370,000 people have applied to take the tests. An academic subject test database of class C skill certification has also been set up.

(IV) Expansion of Training Capacity

Through active promotion of the e-Learning Website for Vocational Training Program, as of December 2007, the website had developed 217 modules for 17 occupations representing 292 hours of teaching. These have been used up to 320,000 times with over 8,000 people completing the learning and testing processes. This represented a boost to the e-training resources of vocational training organizations and cultivated teaching cadre for e-Learning in order to boost laborer understanding of their rights and the nation's competitiveness as a whole

2.4 Achievements in Promoting Global Huayu e-Learning

I. Program Summary

The Overseas Compatriot Affairs Commission (OCAC) joined the ELNP in 2007 and introduced its years of experience in overseas compatriot education into this key long-term strategic national project. Great strides have been made since the program was launched and these are summarized below:

(I) Development of the "e-Learning Huayu of Taiwan" Virtual Channel

The "e-Learning Huayu of Taiwan" (Huayuworld) has used the "Global e-Learning center for the study of Chinese language " operated by the OCAC as its basis. Upon our resources, we have then developed on online platform with major functions: Community, School, Yellow Page and Products. The platform offers not only language learning services but also blogs, forums, and Wiki resources to provide a venue for people interested in learning Mandarin to share their experiences. It has now become one of the most popular Mandarin e-Learning networking platforms.

(II) Establishment of Substantial "Huayu e-Learning Centers"

13 demonstration " Huayu e-Learning Centers" have now been set up in the U.S. in Washington D.C., New York, Atlanta, San Francisco, Los Angeles and Orange County as well as Vancouver (Canada), Toronto (Canada), Durban (South Africa), Tokyo (Japan), Bangkok (Thailand), Sydney (Australia) and Sao Paulo (Brazil). These support Huayu education, teacher training, cultural exchanges and teaching material exhibits. These along with the multimedia and interactive online learning courses provided by the "e-Learning Huayu of Taiwan" blend the virtual channels with the physical and even more importantly, help promote Huayu e-Learning throughout the world.

The OCAC has also produced a variety of multimedia Mandarin teacher training courses so overseas teachers can learn about the latest developments in e-teaching no matter where they are, without having to return to Taiwan. Each issue of the "Chinese Learning Biweekly" published every two weeks is now seeing 630,000 hits as well.

II. Program Benefits

With the worldwide growing interest in learning Chinese, the provision of a government-sponsored e-Learning platform for service providers and users has served to stimulate industry developments. This will in turn transform Taiwan into a global center for studying Mandarin and raise the international accessibility to Taiwan's educational resources. The overall benefits are as shown in Table 2-4-1.

Table 2-4-1 Overall Benefits of the "Huayu e-Learning Program for Overseas Chinese"

Seizing the Advantage	Taiwan's strength in the Mandarin e-Learning industry and teaching services can be harnesses to construct physical and virtual marketing overseas channels that will give Taiwan the advantage as the spokesperson of Mandarin-speakers.
International Marketing	Create a unique e-Learning business model that connects overseas compatriot schools with their local community and mainstream educational establishment to market the quality services and products developed by Taiwan to the world.
Expand Influence	The strengthening of overseas chinese schools' relationships with Taiwan will shape a new profile of our overseas compatriot education, accelerate bonding with mainstream schools and the community, and open up new frontiers for Taiwan's Mandarin teaching services.

Source: OCAC

2.5 Achievements in Promoting e-Learning for Art and Culture

The Council for Cultural Affairs (CCA) launched the "Cultural Affairs, School of E-Learning" (CASE) school in 2003 to establish a professional online learning mechanism for Taiwanese art and culture. The CCA then went on to integrate all of its subsidiary cultural units to create a single " Art Learning Website " portal. Through this portal, all the different learning groups can learn about all kinds of artistic and historical knowledge in order to pass on the beauty of Taiwanese culture.

I. Program Summary

A variety of different courses were offered for session 1 to 3 of CCA's CASE School The focus of the first two sessions was on "community culture", with the main emphasis being on the creation of basic network infrastructure, courses, website promotion and community management. For session 3, the CCA wished to support the "Creative Cultural Industry" aspect of the Executive Yuan's "Challenge 2008: National Development Plan". The CASE School's learning platform's mission therefore included the marketing of government policy initiatives, nurturing of expertise, dissemination of the latest information and serving as an industry-government-academia databases.

The 4th session of the CASE School focused on the "Taiwanese Culture Course". It consisted of 12 course modules each containing 2 hours of audio-visual content. The theme for the 5th session of the CASE School was "Citizen Aesthetics" and aimed to improve the aesthetic refinement of the visual environment and support a healthy art and cultural lifestyle; the 6th session of the CASE School looked at "Cultural Heritage Conservation" to support the conservation of antiques, historical monuments, folk arts, folk cultural relics and natural landscapes of great historical interest, cultural importance and artistic value.

II. Program Benefits

(I) Qualitative Benefits

An efficient and standardized e-Learning platform was set up to support the sharing and exchange of all kinds of knowledge. Web 2.0 features (such as blogs and personalized webpages) were also incorporated and the existing e-Learning membership base of the CCA and its subsidiary organizations consolidated under one roof. Links were also established to digital collections to provide advanced learning resources such as bibliographies and dictionaries so users may make an active contribution and provide their feedback.

(II) Quantitative Benefits

There are 146 hours in 6 stages with 55 e-Learning courses at CCA's e-Learning school. The National Taiwan Craft Research Institute produced 64 e-Learning courses in 3 stages; the traditional arts produced 54 e-Learning courses in 3 stages at e-Learning school ; the " Taiwan fine arts – e-Learning fine arts museum " produced 7 hours; the "e-Learning of Taiwan History " produced 10-unit courses in 2 stages ; and the "King of Traditional Arts – e-interactive learning for children" produced 12 courses. On top of these, the CASE think-tank produced five sessions of publications while conduct trainings in 3 stages to train 180 staff for cultural institution and art & culture groups (Table 2-5-1).

Table 2-5-1 Results from Session 1 ~ 6 of the CCA CASE School

Session / Item	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Total
No. of Hours of e-Learning Materials Produced	24 hours	23 hours	36 hours	24 hours	23 hours	13 hours	143 hours
Enrollments	6,576	7,535	13,044	38,964	43,964	62,436	172,519
Website Views (Hits)	60,000	110,000	130,000	140,548	786,833	104,7163	104,7163
Frequency and Length of Physical Events Held	Frequency: 6 Hours: 10	Frequency: 3 Hours: 21	Frequency: 3 Hours: 11	Frequency: 4 Hours: 18	Frequency: 5 Hours: 39	Frequency: 8 Hours: 32	Frequency: 29 Hours: 131
No. of Teaching Materials (Cumulative)	48	93	334	490	580	673	673
No. of Participants in Physical Events	134	165	130	222	259	175	1085
No. of Discussion Posts (Cumulative)	4,173	5,635	6,278	9,494	10,376	11,258	11,258
Blog Applicants					162	227	389
Graduates	262	405	339	897	468	624	2,995

Source: CCA

2.6 Achievements in Promoting e-Learning in National Palace Museum

When the National Palace Museum (NPM) began implementing the "NPM Chinese Art and Culture e-Learning" 5-year plan in 2003, it marked the start of the NPM's mission to use IT technologies to promote education and provide a demonstration of "Museum e-Learning" applications.

I. Program Summary

At the NPM, the development of digital contents is given the greatest priority. Based on past experience, this essentially involved the conversion of conventional tours and teaching materials into three different digital forms. "e-Courseware" were presented in the form of multimedia animations on the "NPM e-Learning" website. An interactive CD-ROM edition was also available. (Table 2-6-1)"e-Aids" used portable devices (such as Tablet PCs and PDAs) and wireless networking to provide guided tour service while "e-Exhibits" exploited the freedom from time and space as well as the ability to learn any time, anywhere, to offer an all-new museum experience.

II. Program Benefits

When past promotional efforts were reviewed, those that delivered results on a regional scale could be sorted into two general approaches:

(I) Developing "Museum-School Collaborations" model with Local Education Establishments

In 2005, the NPM collaborated with the Taipei City Department of Education on the "Wireless Taipei, Unlimited Learning" project. Primary and secondary school wireless networks were used to combine NPM's e-Learning resources with the school curriculum to form a "Museum-School Collaborative" model. This took the form of three complete learning stages, these being the "Pre-Visit" phase when the teachers went online to access the resources for compiling their own teaching materials and student reading lists; the "In-Visit" phase featuring e-tours and Wireless Internet service; and the "Post-Visit" phase with extended online reading, sharing and themed creative projects.

(II) Promotion of the "Mobile Digital Museum" Concept through National Traveling Education Services

To realize the "Mobile Digital Museum", the NPM chose the Poem of Sung Emperor Hui-zong as the motif for the "Butterflies on a Scented Trail Chasing the Evening Breeze – The Imperial Garden of Sung Emperor Hui-zong " digital multimedia exhibition. In January 2005, the exhibition left the NPM and was launched at the C.K.S. Memorial Hall in Taipei. Since then, it has toured the Taichung County Seaport Art Center, the National Center for Traditional Arts in Yilan, the National Museum of Prehistory in Taitung and the Kaohsiung Museum of History. Local workshops, visits and cultural activities were hosted at each location as well.

In March 2006, the exhibition even ventured deep into school campuses with an exhibition at the National Chiao Tung University in Hsinchu and a teaching multimedia design workshop hosted in central China as well; in July, 2006, an experiment in "Integration of Real and Virtual Tours" was hosted at the Lin Family Garden, a noted historical monument in Banciao. This proved to be a great success. During the 22-month period, the exhibition attracted more than 250,000 visitors and was a critical success.

Table 2-6-1 Completed English e-Learning Courseware

Topic	Module	Duration (Minutes)
A Marvelous Journey Through Bronzes!	1. A Marvelous Journey of Bronze – Course Summary 2. Not Everyone Can Do This: Types and Functions of the Bronze Vessel 3. The Pursuit of Beauty – The Forms and Décor of the Ancient Bronze 4. The Story of Writings in Bronze – Unlocking the Secrets of Bronze Inscriptions 5. Ancient Status Symbols: The Exquisitely Crafted Bronzes of the Shang 6. Enduring Emblems: The Family Crests of the Ya-ch'ou Clan 7. History Cast in Bronze: The Inscriptions of the Mao-Kung Ting, the San P'an Basin, and Tsung Chou Chung 8. More Than Just a Pretty Picture: The Evolution and Significance of Bronze Decoration 9. Music from the Ancients: The Story of the Bronze Bell 10. The Advanced Bronze Casting Techniques of the Ancients 11. The Conservation and Restoration of Bronzes 12. The Collection and Study of Ancient Bronzes	240
Exploring Chinese Ceramic	Exploring Chinese Ceramics with Dr. Dragon	30

Topic	Module	Duration (Minutes)
Cracking China	Cracking China: Porcelain Manufacturing in the 18th Century	30
Caring for Collectible Objects	Caring for Collectible Objects	30
Chinese Paintings	1. Looking at Chinese Paintings 2. The Story in the Painting	60
Protecting Your Valuable Collections	Protecting Your Valuable Collections – You can do it, too!	30
Chinese Calligraphy and Opus Collections	1. The Representation of Emotion in Chinese Calligraphy 2. The Prince's Wonder World	60
New Understanding of Antiques – Using Scientific Ways to observe and Analysis	1. The Purpose and Procedures of Scientific Analysis 2. Methods of Scientific Analysis	60
Chinese Jade	1. Adventure at Gemstone Village 2. Mobilization of Mythical Animals 3. Identify the Treasures 4. Princess Jewel is Getting Married 5. Jade is Around Us	150
Total of 9 topics	Total of 27 modules	590 minutes in total

Source: NPM

2.7 Achievements in Promoting e-Learning for Medical Service

The Department of Health (DOH) of the Executive Yuan proposed the "e-Learning National Project – Medical e-Learning Development Plan" to set up medical e-Learning courses for the 10 main types and 13 chronic diseases common to the people of Taiwan for the general public, patients, patients' families and medical workers. This included the development of the "Formosans' e-Medical School" (FMS) medical e-Learning platform.

I. Program Summary

(I) Medical e-Learning Platform – Formosans: e-Medical School

The DOH's medical e-Learning platform, known as the FMS, was set up in 2004 and its contents included categorized courses, course searches, learning portals, tests, student management, learning record management and certification management. Users may register for free to use the online learning, full text search, personalization, customer support, online voting, statistics and after-class questionnaire services. Once members of the general public register for free as a member and pass the online interactive certification test, the system will issue them with the appropriate certification of completion for that course.

(II) Model Medical e-Learning Courses

To enrich the content on the platform, the DOH invited experts to select the "Top 13 chronic diseases in 10 categories among the Taiwanese population". The DOH then worked with local medical institutions and associations to develop model e-Learning courses (Table 2-7-1) with a total length of 201 hours.

II. Program Benefits

(I) Qualitative Benefits

Advances in technology have overcome the longstanding imbalance in medical and treatment information to establish a sound relationship between doctors and patients. The DOH also worked with the CPA to make the e-Learning courses for chronic diseases available on the "e-Public Service " website. So popular are the DOH courses that they account for 6 of the 10 most popular courses viewed by civil servants . Changes to the Physician's Act also allowed e-Learning courses to count towards their continuing education score.

Table 2-7-1 Authors of the Model Courses

No.	Disease Name	Authoring Unit of Teaching Materials
1	Common Women's Complaints	Taiwan Association of Gynecologic Oncologists
2	Diabetes	Diabetes Association of the Republic of China
3	High Blood Pressure and Heart Disease	Civilian Administration Division of the Tri-Service General Hospital
4	Kidney Diseases	Civilian Administration Division of the Tri-Service General Hospital
5	Stroke and Other Cerebral Vascular Diseases	Buddhist Tzu Chi General Hospital
6	Chronic Liver Disease and Liver Cirrhosis	Liver Disease Prevention & Treatment Research Foundation
7	Eye Disease	Taipei Municipal Chung-Shin Hospital
8	Arthritis and Rheumatism	Taipei Veteran's General Hospital
9	Asthma and Chronic Obstructive Pulmonary Diseases	Taipei Hospital, DOH
10	Common Psychological Illnesses	Bali Sanatorium, DOH
11	Obesity	Taoyuan Hospital, DOH
12	Alzheimer's Disease	Taichung Hospital, DOH
13	Common Shoulder Joint Diseases	Tainan Hospital, DOH

Source: DOH

The above project has not been certified by the US "Health on Net" organization but also received Level AA e-Learning quality certification from the MOEA Industrial Development Bureau in 2006 and 2007. Other awards include a bronze medal in the "Education & Learning" category of the 8th Click! Awards (the top award for government agencies) and an honorable mention in the computer and IT category of the Executive Yuan's setup, participation and suggestion system.

(II) Quantitative Benefits

As of December 2007, a total of 3,667,651 people have either used the FMS' e-Learning service or the medical advice feature (excluding those that used licensed course content for teaching). The e-Learning program was also promoted in the clinics, waiting rooms and health clinics operated by the DOH and other public/private hospitals. A total of 5,050 sessions were held and attended by more than 600,000 people.

2.8 Achievement in Promoting e-Learning for Hakka Language and Culture at the CHA

In 2004, the Council for Hakka Affairs (CHA) ,the Executive Yuan launched the "Global Hakka Language and Culture e-Learning Program" and set up the Hakka e-Learning Center (http://elearning.hakka.gov.tw/). The e-Learning platform would help promote Hakka language and culture, and in turn encourage worldwide interesting in Hakka culture e-Learning.

I. Program Summary

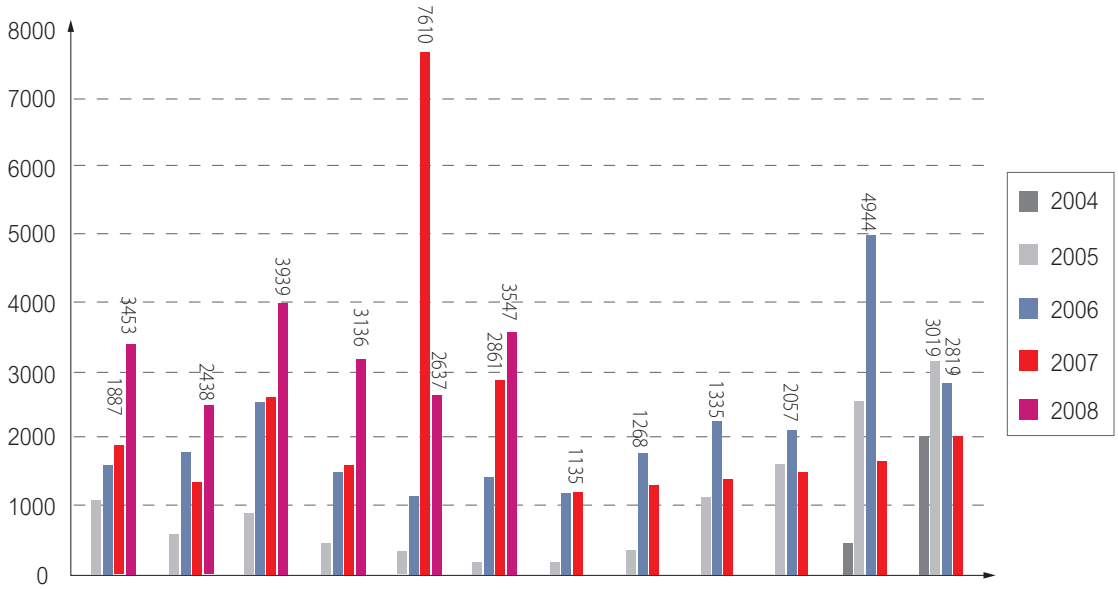
(I) Creating a Global Platform for Hakka Culture

Since the Hakka e-Learning Center was set up, it has been visited by people from 527 cities in 70 countries from around the world. Between the time the site went online and December 31, 2007, it has been viewed by 847,244 people and has built up a membership date of 18,283 people (Figure 2-8-1). At the same time, experts have been invited to teach online to provide children and youths with e-Learning courses related to Hakka language and content. The courses have been gradually expanded as well. E-Learning courses produced for the Hakka e-Learning Center include "Hakka Language", "Hakka Music", "Hakka Traditions and History", "Hakka Literature", "Creative Hakka Cultural Enterprises", "Hakka Children" and "Collaborative Tertiary Courses". These cover seven major categories, 103 courses and 653.5 hours of content. The Hakka e-Learning Center has also cooperated with the OCAC's overseas compatriot language education center and local overseas compatriots' associations to encourage Hakka migrants living overseas to learn about Hakka language and culture.

(II) Enriching e-Learning Materials for Hakka Language and Culture

The Hakka e-Learning Center partnered with 10 universities and colleges to develop 29 courses with a total length of 85 hours. The online real-time interaction tools provided by this platform were also used to organize two or more distance education sessions each semester. 42 "Hakka Language and Culture Multimedia Teaching and Production Workshops" to train vernacular language teachers for elementary and junior high schools.

Figure 2-8-1 Visitor Statistics for the Hakka e-Learning Center from Past Five Years



Source: CHA

(III) Creation of the First Hakka Online Game

The "Hakka Challenge" online game was hosted using the content of the Hakka e-Learning Center's "Hakka Challenge" word-snake card game. This sought to promote the Hakka language through play. In 2006, up to 5,722 registered for the competition and in 2007, the number of entries from students in 531 elementary and junior high schools throughout Taiwan grew to 16,000 people. Another online game called "The Gongs and Drums of Liouduei " using events from Hakka history as its background. When the website was launched at the end of 2007, in just 10 days it had attracted 7,384 members and hosted 7,745 player characters. Total time spent online had reached 84,530 hours. With 86,587 in total, this meant that every player spent nearly an hour online each time they log in. The website has since launch accumulated 1,302,773 views and 15,981 registered members.

II. Program Benefits

The linking of the Hakka e-Learning Center with the Hakka language ability certification website was intended to promote learning of the Hakka language through everyday life in an effort to make Hakka

a more pervasive part of everyday life, and vice versa. This would in turn help boost interest in learning Hakka. After the Hakka language ability certification site was opened on December 1, 2005, it had accumulated 2,628,403 views by December 31, 2007. Additionally, the "Global Hakka e-Learning Center" has worked with academics, experts, schools and businesses to produce a variety of Hakka e-Learning courses. It has created a Hakka e-Learning industry that will give the whole world the chance to learn about Hakka language and culture.

2.9 Achievements in Promoting e-Learning for Indigenous Peoples

The Council of Indigenous Peoples (CIP) of the Executive Yuan proposed the "Indigenous Peoples e-Learning Center in Taiwan" 3-Year Plan to provide an effective method for preserving Indigenous Peoples cultures and traditions. The implementation of this ELNP projects intended to create an e-Learning model for Indigenous peoples in Mandarin-speaking societies and realize the goal of national learning.

I. Program Summary

Through the "Indigenous Peoples e-Learning Center in Taiwan" (Taiwan Indigenous Peoples Culture and History Learning Network), the "Taiwan Indigenous Peoples Culture and History Learning Network for Kids" as well as the establishment of the "Taiwan Indigenous Peoples Digital Teaching Resource Center", the CIP hoped to construct an Indigenous Peoples e-Learning network that would narrow the digital divide. The Digital Teaching Resource Center in particular possess several key features such as indexed search, metadata import/exporting and a system interface integration mechanism. The website itself is composed of three elements: Portal, Application Server and Database.

II. Program Benefits

(I) Qualitative Benefits

The Indigenous Peoples e-Learning Center in Taiwan established first in 2005 to provide an online repository of photos and text about Indigenous Peoples arts and crafts. This provided an in-depth understanding of the Indigenous Peoples lifestyle. This was then followed by the creation of the Taiwan Indigenous Peoples Culture and History Learning Network for Kids to make the content accessible to young students as well (Figure 2-9-1). Finally, the Taiwan Indigenous Peoples Digital Teaching Resource Center was set up to share and organize digital resources and teaching materials so the goal of resource sharing and reuse could be achieved.

(II) Quantitative Benefits

A serious digital divide exists for the Indigenous peoples, but according to the digital divide survey conducted by the RDEC in 2007, the proportion of Indigenous Peoples that had used a computer before

had increased from 43.8% in 2004 to 67.2% in 2007; the number of those that had used the Internet had increased from 37.8% in 2004 to 60.9% in 2007 as well. The proportion of Indigenous Peoples in highland communities that owned a computer has increased from 45.2% in 2004 to 60% in 2007. The number of home Internet connections has also grown from 35.8% in 2004 to 54.4% in 2007. These all showed outstanding progress made in the effort to narrow the digital divide.

Figure 2-9-1 Benefits Generated by the Indigenous Peoples e-Learning Center in Taiwan in 2006

Source: CIP

Since the Indigenous Peoples e-Learning Center in Taiwan (Taiwan Indigenous Peoples Culture and History Learning Network) went online in 2005, it has been viewed by a total of 95,072 people. In 2006 while the Taiwan Indigenous Peoples Culture and History Learning Network for Kids was in operation, a total of 416,866 page views were recorded, with 16,334 unique visitors, 43,475 views and 2,341 effective members. The Digital Resource Center set up in 2007 is a teaching platform with resource sharing. Since its commissioning, it has been viewed by 13,143 people and collected 2,477 teaching resources.

At the same time, the CIP has also reviewed the 216 modules in 53 history & culture courses, 15 e-Learning for kids courses and 8 Indigenous Peoples vocational courses then compiled the contents into evaluation tests that the users can use to measure their own progress. All of these represent achievements made towards e-Learning for indigenous peoples.

2.10 Conclusion

In the five years since the inception of the ELNP (2003~2007), significant progress has been made among government departments and public service. Not only has it helped to establish a lifelong learning environment, improved the learning quality for civil servants , created learning opportunities for the general population but has also boost the utilization rate of e-Learning applications. The various agencies in particular have developed the most suitable applications and service models for their own particular field to realize the vision of a knowledge economy.

The government ministries and agencies in Taiwan have made use of e-Learning to provide more varied learning channels. This has benefited over 15 million people and made a significant contribution to raising the standard of artistic and cultural refinement among the general population. With the CHA for example, the "Hakka Network" serves as a medium for local and foreign people to learn about and eventually appreciate Hakka language and culture; the CCA chose to provide a diverse range of courses, add value to traditional artistic, historical and cultural assets, and also bring digital resources and materials together to provide the general population with free art and cultural education; the NPM on the other hand adopted a digital museum concept to digitize cultural relics that are then combined with physical exhibitions to achieve a fusion of the real and virtual; the CIP selected the "Indigenous Peoples Online Academy" approach to conserve Indigenous Peoples culture; finally, the OCAC devoted its efforts promoting Mandarin e-Learning.

As for government departments and public service, the CPA consolidated the digital resources of government departments to set up unified login mechanism for personnel resources; for workers that are unemployed, looking for jobs or ready to join the work force, the CLA offers e-Learning courses that help build basic vocational competencies; the DOH worked with experts to set up the FMS and offer model medical e-Learning courses; the MOE supported the setup of e-Master's degree programs and has so far certified the quality of 5 programs at 3 institutions. This development represents gradual improvements made to the quality and accessibility of formal education.

e-Learning is one of the key factors governing improvements in national competitiveness. Thanks to government efforts, significant achievements have now been realized in public welfare. These are now all helping Taiwan become a quality society in terms of employment, recreation, culture, medicine and language.

Chapter 3
Promotion and Development of the e-Learning Industry

The "e-Learning Industry Promotion and Development Plan" (IDB Phase 1 Plan) is managed by the Industrial Development Bureau (IDB) of the Ministry of Economic Affairs (MOEA). The focus is on assisting businesses with the introduction of e-Learning, and encouraging the development of business opportunities for the e-Learning industry. This chapter provides an overview of the e-Learning industry and market in China as well as its developments and achievements over the past few years.

3.1 e-Learning Network Science Park

The "National Science and Technology Program for e-Learning" used the physical science-based industrial parks as its inspiration for developing a virtual "e-Learning Network Science Park" ("ePark") on the Internet for the e-Learning industry. The goal was to attract local and foreign suppliers or customers for e-Learning services in order to create a cluster for industry, talent, creativity, technology and financial resources. This will boost the value of the e-Learning industry and promote interest in lifelong learning. The tangible benefits from the promotion of the ePark are described below.

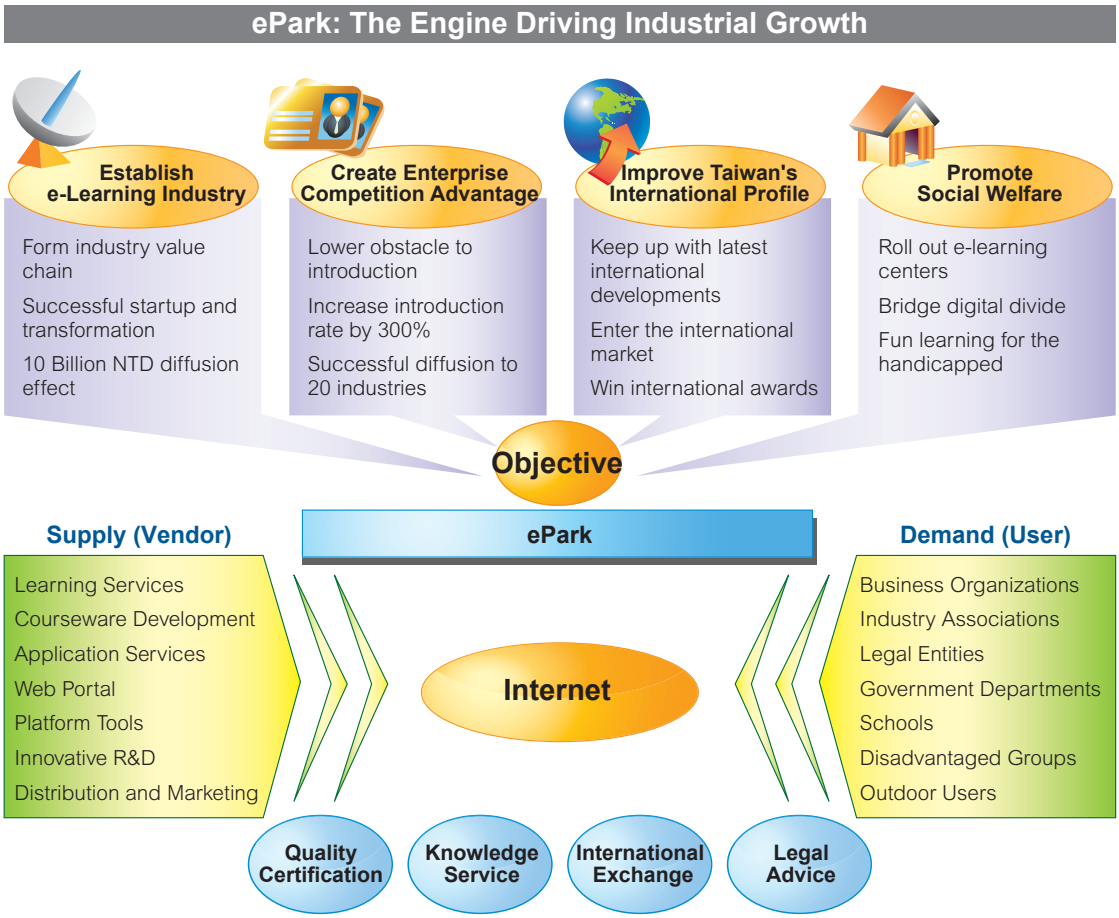
I. e-Learning Supply and Demand Cluster

Tenants at the ePark came from both the supply and demand side. These may be divided into seven main categories (Figure 3-1-1). By the end of 2007, 104 units had joined the ePark, with 67 from the supply side and 37 from the demand side, creating an interactive e-Learning cluster with transparent flow of supply and demand information.

In the 5 years between 2003 and 2007, over a hundred medium-to-large scale e-Learning related activities were held through the ePark and attended by at least 2,764 vendors/units and 8,194 people. A variety of incentives and assistance initiatives were also launched to encourage the setup of learning networks by over 120 businesses and organizations.

During the 5 years, ePark output rocketed from 700 Million NTD to 12 Billion NTD. The number of businesses also grew from around twenty to over two hundred. 137 e-Learning centers were set up around Taiwan, with 11 named model projects and led to the introduction of e-Learning in more than 20 industries. The adoption rate for e-Learning among large enterprises (the top 1000 manufacturing enterprises, the top 500 service industry companies and the top 100 financial companies) also grew significantly, increasing from 14% to 52%.

Figure 3-1-1 ePark Framework



II. Quality Certification & Knowledge Service

To improve the quality of the courseware and services provided by domestic e-Learning suppliers, the ePark drew on overseas guidelines and standards by dividing quality into three levels: A, AA and AAA. In 2007, a total 53 cases passed the e-Learning Courseware Certification (ELCC) process. 16 received level A certification, 33 received level AA certification and 4 received level AAA certification. 55 passed the e-Learning Service Certification (ELSC) process, with 15 receiving level A learning unit certification, 32 receiving level AA learning certification, 4 receiving level A course certification and 4 receiving level AA course certification.

To improve the quality of the courseware and services provided by domestic e-Learning suppliers, the ePark drew on overseas guidelines and standards by dividing quality into three levels: A, AA and AAA. In 2007, a total 53 cases passed the e-Learning Courseware Certification (ELCC) process. 16 received level A certification, 33 received level AA certification and 4 received level AAA certification. 55 passed the e-Learning Service Certification (ELSC) process, with 15 receiving level A learning unit certification, 32 receiving level AA learning certification, 4 receiving level A course certification and 4 receiving level AA course certification.

The ePark also studied the current state of development in e-Learning in 7 countries; America, Japan, Korea, China, Singapore, Thailand and Malaysia. Three market analysis sessions were then held to help over 20 businesses understand the local e-Learning market conditions in these regions. At the same time, the ePark assisted the e-Learning industry by developing case studies of successful training projects. 32 of these were based on overseas experience, while four were based on local experience. The results were used to establish a searchable database of local and overseas training effectiveness evaluations. Using the Return on Investment (ROI) evaluation model, ePark set up two e-Learning introduction case studies featuring Chen Loong Corp. and Johnson Fitness for other businesses to learn from. An “e-Learning Moving Forward International Summit” was established with major international consultation companies invited to assist companies with internationalization.

These project results were reported in hundreds of print and electronic media articles. The Commercial Times and Economic Daily News even set up columns dedicated to providing regular coverage of achievements in e-Learning. Additionally, the ePark support website (http://www.epark.org.tw) was visited by up to 536,697 people in 2007 after it went online.

In the 5 years that the IDB Phase 1 Plan was in effect, training was provided to a total of 1,149 companies were and 3,422 people attended the professional e-Learning courses. This laid down a solid foundation for the industry’s future development. The IDB also collaborated with 5 vocational institutes to develop 508 courses in 8 categories such as system analysis and program design. These were attended by up to

13,565 students. Support was also provided for the creation of IT certification exams. These achieved an above-average passing rate of 35.9% and demonstrate the courses' learning effectiveness.

III. International Exchange

To connect with the international community, ePark actively supported international exchange initiatives and helped businesses participate in international competitions and exhibitions. Between 2003 and 2007, a total 794 people from 130 e-Learning businesses and government projects exhibited overseas and went on overseas visits, attracting the attention of over 300,000 people in the international community.

ePark also hosted a series of international symposiums in Taiwan throughout 2007, such as the Human Capital & e-Learning Symposium attended by 500 experts. Key international speakers from MIT and other organizations were also invited to share and discuss their views on Internet developments. This attracted an audience of 700 experts as well. In response to current developments in Japan and Korea, ePark organized the " Taiwan-Japan-Korea Digital Content Industry Forum". 33 booths were set up by 31 vendors (13 from Japan and Korea) from 3 countries and the forum was attended by 372 people.

To promote the integration and sharing of learning resources as well as connect with international learning standards, ePark took an active role in the development of learning resource standards at the Advanced Distributed Learning (ADL) organization. Overseas technology was also introduced in 2003 and 2004 to focus on the development of the Sharable Content Object Reference Model (SCORM) 2004 standards. ASCORM-compatible platform, editing tools and courseware were developed and interoperability certification achieved with ADL SCORM 2004.

Thanks to the above efforts, ePark won the right to host the first ADL International Plugfest II in Asia. This was attended by 120 international experts from 20 countries. As of 2007, technology transfer agreements for SCORM's Ver 1.2 and 2004 edition modules have now been completed with over 21 local vendors. This means that 90% of local platforms are now SCORM-compliant, saving vendors 7.2 million NTD in R&D costs.

For international certification and competitions, "e-Learning Courseware: Phase Analysis" passed the American Society of Training and Development's (ATSD) e-Learning Courseware Certification (ECC) process, making Taiwan one of the few Asian countries to achieve this certification.

IV. Legal Advice

The fast changing nature of the Internet means that there often are disputes because consumers do not yet fully understand all the new sales models developed by the vendors. In response, the ePark's legal

advice services paid particular attention to the publication of government legislation as well as the drafting of regulations favoring industry development to ensure a sound environment for the development of e-Learning.

Taking into account the nature of the e-Learning industry, the legal advice took the form of FAQs for intellectual property rights, consumer protection laws and fair trading laws. Seminars and symposiums were also held to familiarize vendors with Taiwan's current regulatory regime. Legal information was promoted through the regular ePark newsletter as well.

To reduce the number of consumer disputes, ePark not only helped the Consumer Protection Commission of the Executive Yuan with the drafting of the "Standardized Contract for Internet Learning Template" but also set up a "Self-Regulation Commission" mechanism to help vendors introduce the Consumer Safety Mark supervised by an impartial third-party consumer organization.

3.2 Strengthening Competitiveness through Enterprise e-Learning

I. Overview of e-Learning Introduction in the Industry

In the five years that the IDB has been promoting the "e-Learning Industry Promotion and Development Plan", great progress been made in the introduction of e-Learning in the enterprise sector. According to the "Survey and Analysis of e-Learning in Enterprises" reports produced by the China Credit Information Service, the adoption rate for e-Learning among the top 1000 manufacturing companies, top 500 service companies the top 100 financial companies has grown from the 16% in 2003 to 52% in 2007, an increase of over 300%. Direct assistance and funding was provided to a total of 115 enterprises and 14 industry associations (Figure 3-2-1).

Figure 3-2-1: Diffusion Effect from Enterprise Introduction of e-Learning

Year	2003	2004	2005	2006	2007
Introduction rate among large enterprises (%)	16	23	35	42	52

In terms of individual industries, the introduction rate was highest in the financial sector with 74.3% in 2007. The service industry's introduction rate also reached 56.2%. Five local convenience store chains in Taiwan (Uni-President, OK Mart, Hi-Life, Nikomart and FamilyMart) in particular have all introduced 100% e-Learning. As for the manufacturing industry, the example set by companies such as China Steel, Wistron, and Cheng Loong Corporation has led to an introduction rate of 46.7%. This helped to overcome the problem of inadequate IT adoption among the traditional manufacturing sector.

A review of records on businesses that received government assistance and support in the past years also showed that over 40,000 courses totaling nearly 80,000 hours of content have now been developed. More than 4.4 million workers have undertaken e-Learning courses as well. It is worthwhile to note that these statistics only cover enterprises that received government assistance. If those that introduced e-Learning on their own initiative were included as well, the total number of works would exceed 15.84 million.

II. Benefits and Results from Enterprise Introduction of e-Learning

Apart from the "quantitative" increase shown by the statistics, there has also been a "qualitative" change in the role played by e-Learning in enterprises. Based on the experience of actual enterprise introduction of e-Learning and the associated training and assistance, e-Learning applications can be generally grouped into six major golden operating models as described below:

(I) Golden Operating Model 1: Human Resource Integration

Human resource integration is the most widespread application of e-Learning. Yung Ching Realty, for example, has 350 branch offices and after the introduction of e-Learning, reduced the training time for new recruits from 14 weeks to 5 weeks. In the past, certain physical courses were only available to branch managers. These were converted into e-courseware and made available to all employees, leading to a significant boost to sales, with some agents meeting their annual targets two months early.

(II) Golden Operating Model 2: R&D Acceleration

Enterprises produced e-Learning courseware on key topics in their R&D and manufacturing processes. This helped R&D and manufacturing personnel to acquire critical expertise, boosting productivity and yields while reducing returns. This translated directly into higher revenues and profits.

(III) Golden Operating Model: Connection with Business Performance

The integration of e-Learning with business activities offered one of the golden operating models for e-Learning as well. The Taishin Bank, for example, developed the "Blended Simulation Training for Collection

Personnel" that incorporated real-life customer scenarios with e-Learning for their accounts collection personnel. This improved the collection success rate and also helped to preserve good customer relations.

(IV) Golden Operating Model 4: Customer Satisfaction Improvement

Customer service representatives were trained through e-Learning while standard troubleshooting procedures for company products were turned into e-Learning courseware as well. This allowed customers to solve the problems on their own and delivered significant savings in customer support costs.

(V) Golden Operating Model 5: Strengthened Industry Links

By extending e-Learning to upstream and downstream vendors, knowledge and information could be disseminated in a more efficient manner. Changes to environmental legislation, for example, had a major impact on supply chain operations. Companies like Wistron, Accton and Zyxel however made use of e-Learning to bring their supply chain partners quickly up to date on the latest changes, greatly reducing the potential risks and costs associated with product returns.

(VI) Golden Operating Model 6: Integrated Knowledge Management

The effective integration and sharing of knowledge through e-Learning helps enterprises achieve sustainability and prevents their competitiveness from being damaged by employee turnover. China Steel, for example, expected to encounter a wave of retirements among its experienced workers after 2010 (at around 500 people per year with a wave that would last for several years). To prepare for this eventuality, the company is now preserving their knowledge through e-Learning and ensuring the company's long-term sustainability.

III. International Recognition of Successes in Enterprise Applications

In 2005, the Institute for Information Industry (III), the Tamkang University and Sun Net joined together to develop the " Mobile Learning – Pocket SCORM" project for TransAsia Airways. By providing each pilot with a PDA, the problem of being unable to gather the trainees together for training was solved. This approach also allowed pilots to use their stand-by times to study. Due to the success of applying this emerging technology, the well-known US-based learning research organization Brandon Hall awarded the project a bronze in the "Innovative Technology" category.

In 2007, the III and aEnrich partnered to develop the "The Implementation and Evaluation of e-Learning" project for Lai-lai Convenience Stores (OK Mart). This project went on to beat over 200 other projects from around the world to win the bronze for the "Best Results of a Learning Program" award.

3.3 Establishing the e-Learning Industry

I. Overview of e-Learning Assistance for the Industry

As the domestic e-Learning industry is still an emerging industry, and most businesses had not yet achieved sufficient economies of scale, the Plan decided to provide industry assistance through four aspects: development of market opportunities, establishment of core competencies, strengthening of innovative applications and promotion of common standards. The focus for "development of market opportunities" was on analyzing global market trends, helping businesses attend international exhibitions and inviting overseas buyers and distributors to visit Taiwan in order to help develop the global market. The focus in "establishment of core competencies" was on research of emerging technologies in e-Learning in order to cultivate businesses' content integration, platform technology, courseware production and mobile learning capabilities.

For "strengthening innovative applications", the focus was on promoting success stories of innovative applications from around the world. This would serve to inspire people involved in the industry and encourage them to become involved in the R&D of innovative applications. The focus for "promotion of common standards" was on introducing standards appropriate to the domestic industry and helping companies develop excellent products to accelerate the pace of market acceptance and growth.

II. e-Learning Industry Growth

The IDB has been assisting the industry through the four areas of market, technology, innovation and quality over the past 5 years. This has seen a significant improvement in e-Learning product quality. Table 3-3-1 summarizes the qualitative and quantitative accomplishments over the 5 years of the plan.

(I) Expansion of the e-Learning Market

In the past, most enterprises opted for e-Learning solutions provided by foreign companies. The ePark's strong support for the international courseware standard SCORM and government assistance, however, has seen homegrown e-Learning products achieve a market share of over 80% in Taiwan.

With the support of government resources, businesses have also gone even further by exploiting their own niches to establish a solid bridgehead in the international market. Cyberlink, O-Pa, LiveABC and Gjun PC

Table 3-3-1 National Science and Technology Program for e-Learning: Before and After

Category	Before Implementation	After Implementation
Learning Service	• Bottleneck in business expansion • Lack of a learning service quality standard	• Computer, language and academic tutoring businesses gradually transitioning to e-Learning • Standards defined and 63 cases certified
Courseware Production	• Only one e-Learning courseware developer • No international courseware projects	• Total of 84 e-Learning courseware received quality certification • Began undertaking overseas projects. Products also expanded to America, Japan, Korea, Thailand, Indonesia, South America and Europe.
Application Service	• No application service model defined • High threshold for introduction of e-Learning	• Two vendors now offer application service provider (ASP) services and total solutions • Over 100 companies persuaded to make use of ASP
Portal Website	• None of the businesses operated a portal website	• Around five businesses now operate portal websites • These offer over 3,500 courses and have accumulated 320,000 members
Platform Tools	• No platform standard and courseware interoperability • A large variety of companies all operating independently	• SCORM standard introduced and interoperability now over 85% • Consolidation among platform vendors and formation of industry value chain
Channel Marketing	• Vendors mainly based on physical operations. No e-Learning center operating model.	• Established 137 e-Learning centers that integrated virtual and physical teaching • 11 centers recognized as model operations

School, for example, have all begun winning international orders and have now formed an "e-Learning Industry Alliance" to develop international business opportunities together.

(II) Improvements in Industry Core Competencies

In platform technology development, close attention was paid to the IMS Global Learning Consortium and the ADL's developments in learning standards and technology. Work also began on the development of

SCROM 1.2/2004 standard modules, with courseware and platform interoperability certification achieved with the US ADL SCORM 2004. During the project, technology transfers of SCORM 1.2 and 2004 modules were accomplished with over 40 domestic companies, putting Taiwan in a position of leadership on the international level.

The creativity of the e-Learning content have been amply demonstrated by companies that have won many international awards such as Bright Ideas Design, IQ Technology (provides Chinese language learning services) and LiveABC (providing English learning services). These all serve as an indication of the international potential in Taiwan's e-Learning content.

As for innovative services in e-Learning, after five years of effort there are now five "learning portal" websites that together offer over 4,000 courses and have a membership of 320,000. The Hi Kids website specialized in childhood education, for instance, now has an annual turnover of NTD 350 Million. As for the "Blended model" of learning, this is now considered the best teaching method for the future and over 130 e-Learning centers had been established by 2008. These include the Taiwan Knowledge Bank's "eSchool" initiative that offers students' value-added services such course repetition and e-Learning classes for the graduate tutoring market.

Application service providers (ASPs) have also emerged to accelerate the introduction of e-Learning by small and medium enterprises. There are now over 100 units that have adopted this kind of service. Chunghwa Telecom's ASP service, for example, includes platform access, server ghosting and e-Learning consulting. This greatly reduces the cost and risks associated with the introduction of e-Learning for enterprises.

3.4 Development of e-Learning Technology Applications

I. Overview of Developments in e-Learning Technology Applications

The objective of the e-Learning project is to develop system integration technologies for the e-Learning environment. The progress so far included: (1) Helping to set up the K9 e-Learning Research and Development Alliance and launching the " K9 e-Learning Industry Supply Chain Technology Integration Project"; (2) Helping setup a division of labor among e-Learning vendors to reduce the cost of courseware production while also solving the problem of interoperability between courseware and platform as well as boosting the volume of courseware transactions; (3) Developing the "Mobile Language Learning Platform" to help vendors develop a scenario-based learning system with integrated language application scenarios, mobile wireless devices and language courseware; (4) Developing the "Learning Portal of Ministry of Education,EDShare" using common indexing technology as the basis. This was combined with the SCORM standard to provide a suitable creative and teaching environment; (5) Conducting R&D into distributed e-Learning content integration and management technologies to meet the demand for learning content from students.

II. Results and Benefits from the Development of e-Learning Technology Applications

(I) Value Creation through Core e-Learning Industry Technologies

During the project, technology transfers/services were provided to 61 companies with a contract value of $48,628,000. These stimulated NTD 670 Million in investments from the private sector, leading to the formation of the domestic e-Learning industry supply chain as well as the development of innovative applications. Another initiative was the setup of the Ministry of Education's digital content sharing and exchange platform. This was the largest platform of its type in Taiwan supports TWLOM/CC. It is now the only SCORM-compliant JAVA and .NET dual-platform solution that supports Chinese voice scoring and is used as a tool for Chinese pronunciation practice.

(II) Innovative Overseas e-Learning Service with Real and Virtual Integration

The SCORM 2004-compliant learning suite was used to assist Taiwan's largest science education vendor K & H through the transfer of three technologies developed by the program: distributed learning management

technology, courseware templating technology and distributed courseware management platform. This successfully converted existing experimental teaching courses into e-Learning courseware. Such a model, blending the real and virtual, is now expected to be exported to over 70 overseas countries.

(III) Accomplishments and Applications of Core e-Learning Industry Technologies

1. Development of Learning Suite

Experts and industry R&D capability was used to develop and set up the Learning Object Repository in Taiwan (LORT, http://www.lort.org.tw), allowing participating vendors, independent operators and primary/secondary schoolteachers and students to exchange share their e-Learning content. This will stimulate the development of the e-Learning content industry. The Council for Cultural Affairs'"Learning Portal of Council for Cultural Affair" (http://learning.cca.gov.tw/) and the National Museum of Natural Science's digital content exchange platform were used to integrate the 10 art and cultural communities at the Center for Traditional Arts to create a unified portal website for Chinese art and cultural learning communities around the world.

The Information Technology Enable Service's (ITES) courseware production service offers Learning 2.0 for joint editing and knowledge sharing during editing. This allows for e-Learning courseware to be developed collaboratively then tested and traded by people in different regions and from different cultures. At the same time, a public education industry supply chain was set up to encourage the e-Learning platform vendor Sun Net and content providers Kang Hsuan and Inteserv to modularize learning content and set up a complete division of labor model for the e-Learning industry. The Ministry of Education in turn set up an e-Learning content sharing and exchange portal (http://edshare.edu.tw/erportal) to provide a mechanism for exchanging a wide variety of teaching resources.

2. Development of Mobile Learning Platform and Aides

The program assisted Acer to introduce an environmental monitoring to a museum for the first time at the National Museum of Natural Science in Taichung. At the same time, this was combined with the mobile learning platform to achieve a close integration between the real and virtual (digital) museum services. Assistance was also provided to Craftsman Software to apply for the development of the " A Prototype of Chinese Oral Practice Device Development Project". This allowed the vendor's online content to be downloaded to the learning device and turn it into an integrated product.

3.5 Conclusion

In the five years that the IDB began implementing Phase 1 of the "e-Learning Industry Promotion and Development Plan" (2003~2007), more than 20 industries have benefited from the plan and 19 industry associations have adopted e-Learning. In total, over 700 companies and more than four million people have taken part in e-Learning, boosting the industry output from NTD 700 Million to NTD 12 Billion.

At the same time, the assistance of the IDB has also encouraged e-Learning vendors to actively develop their capabilities and seek out opportunities for transformation. This has seen companies such as Hebron, Cyberlink, Gjun, O-Pa, Sun Net and IQ Technology assisted to successfully expand into the American, Japanese, Korean and Southeast Asian markets. As a result, the international market has grown from zero to over NTD 500 Million.

The integration of inter-agency resources by the "e-Learning Industry Promotion and Development Plan" has been successful in stimulating demand for e-Learning services in the government, academic and corporate sectors, leading to a snowball effect. This has not only served as a boost to the confidence of the e-Learning industry but also laid down an excellent foundation for the future development of the Taiwan e-Learning and Digital Archives Program.

Chapter 4
Academic Research into e-Learning

The guidance provided by the National Science & Technology Program for e-Learning (ELNP) has seen great strides in the field of academic research into e-Learning over the past five years (2003~2007). These include the publication of many academic papers in well-known local and overseas periodicals as well as the development of pioneering technologies.

Generally speaking, the results from academic research into e-Learning can be divided into three aspects: the fundamentals, the results and the integration. Section 1 of this chapter will look at the "Fundamental" aspect in terms of the research emphasis of the ELPN and achievements; the "Results" aspect will be covered in Section 2 and the first half of Section 3; the second half of section 3 and section 4 will look at the results from the "Integration" aspect of academic research into e-Learning by examining how the ELPN Phase I has influenced teaching and the industry; the final part of this chapter will then provide recommendations for the future.

4.1 Overview of Academic Research during ELPN Phase I

During the ELPN Phase I, key areas of research included[1] : (1) the development of e-Learning content designed to promote the intellectual growth of students and the general public covering the various disciplines (medicine/biology, mathematics, physics, chemistry) at all levels of education (university, high school, elementary school); (2) promotion of digital instruction for Chinese around the world; (3) development of technologies required for the e-Learning industry such as: learning platform technology, learning content management technology and digital copyright management technology; (4) development of e-Learning devices and digital toys to generate interest in learning and establish a long-term dependency with the student; (5) creation of digital games and simulation-based learning content that encourage total immersion of the student; (6) development of Creativity Support Tools that use IT technology to practice the theory of creative learning; (7) design and development of Chinese e-Learning courseware designed for foreigners. The courseware should have a learning framework that covers all topics; (8) compilation of digital Chinese courseware/teaching materials in Chinese culture such as diet, festivals and people, or technical fields such as business Chinese, technology Chinese and religous Chinese.

The above research areas were all aimed at providing solutions that fulfill a need in society. Many of the results have since been published online for the use of the general public. Table 4-1-1 shows a summary of the key accomplishments from ELPN Phase I.

1 Science & Technology Program Office for e-Learning. e-Learning Project Summary Report, 2008/05/30, sourced from: http://elnpweb.ncu.edu.tw/home.aspx

Table 4-1-1 Key Accomplishments in Academic Research for ELPN Phase I

Category	Topic	Accomplishment
Technology & Platform	Language	• Global Chinese e-Learning system (iCANxp) • Digital Resources Center for Global Chinese Teaching and Learning • Corpora and NLP for Digital Learning of English (CANDLE) • Intelligent Web-based Interactive Language Learning (IWiLL)
	Intelligent Technology	• Intelligent Digital Multimedia Content Management System • Mobile e-Learning Authoring Tool (MEAT) • Virtual animal learning companion
	Learning Environment and Platform	• Digital Classroom Environment (DCE) • Technology enriched future classroom • Interactive mobile learning tool (Hyper pen)
	Disadvantaged Groups	• Information and e-Learning platform, courseware and services for the handicapped
Digital Content Development	Medicine	• Chinese Herb Medication Safety (Shannon e Sutra) • Medical Case Study System
	Creativity	• Creative engineering design and implementation course • Creative mechanical design course • Creative art and cultural course
	Local Culture	• Interactive courseware for local culture in Taoyuan, Hsinchu and Miaoli • The Beauty of Taiwanese Food
	Other	• Consultation projects (Industry and commercial psychological consultant) • Sports science • Weather model learning (Birth of the Water Drop)

4.2 Analysis of Academic Accomplishments of Taiwan e-Learning

This section will look at e-Learning related academic papers published by Taiwanese academics in six important international academic journals[2] in recent years (2001~2007). These being; Computers & Education (C&E), Journal of Computer Assisted Learning (JCAL), Educational Technology & Society (ET&S), Education Technology Research & Development (ETR&D), Innovations in Education and Teaching International (IETI) and the British Journal of Educational Technology (BJET). A total of 183 papers with at least one Taiwanese author were selected and the contents analyzed. The results of the analysis were as follows:

I. Overview of Taiwanese Academic Papers on e-Learning

(I) The Five Main Themes

The research topics were divided into five main themes based on their main direction of research (Table 4-2-1):

Table 4-2-1 shows that e-Learning related papers published by Taiwanese academics in recent years (2001~2007) tended to concentrate on “pure system development and evaluation” (113 papers in total). Of these, papers relating to “system development and evaluation of its usage” accounted for nearly half of all published papers (90 in total).

(II) Applicable Level of Education

The five levels of education provided the context for these types of research. These are shown in Table 4-2-2.

Table 4-2-2 shows that among the e-Learning related papers published by Taiwanese academics in recent years (2001~2007), tertiary education formed the largest group (62 papers). This was followed by the Other category: pre-school special education, research community users, unclassified, or contains two or

2 National Science & Technology Program Office for e-Learning. ELNP Project Summary Report: Academic and Technology R&D, 2008/05/30, sourced from: http://elnpweb.ncu.edu.tw/home.aspx

Table 4-2-1: Analysis of "Themes" in e-Learning Papers, 2001~2007

Theme	Description	No. of Papers (Total = 183)
System Development and Evaluation	Description of system development only (no associated evaluation)	23
	System development and evaluation of its usage	90
Student Related Research	Influence of student's learning strategy, belief, attitude, thinking and gender	24
Teacher Related Research	Influence of teacher's teaching method, belief, attitude, thinking… etc.	10
Research into Educational Context	Any research that looks at the context of interactions between two or more elements such as "system", "teacher", "student" and "environment". Does not have to be on-site	32
Other	Including essays and analysis of computer textbooks etc.	4

Table 4-2-2: Analysis on "Level of Education" in e-Learning Papers, 2001~2007

Level of Education	No. of Papers (Total = 183)
Elementary Education	20
Secondary Education	42
Tertiary Education	62
Adult Education (incl. enterprise training)	6
Other (Pre-School Special Education, Research Community Users, Unclassified, or contains two or more levels of education)	53

more levels of education) (53 papers), then secondary education (42 papers) and elementary education (20 papers). The smallest group was adult education (incl. enterprising training) (just 6 papers).

(III) Research Methodologies

These can be generally divided into empirical research and non-empirical research. Empirical research methodologies can in turn be divided into quantitative research, qualitative research and qualitative & quantitative research (Table 4-2-3).

Table 4-2-3: Analysis of "Research Methodologies" in e-Learning Papers, 2001~2007

Research Methodologies		No. of Papers (Total = 183)
Empirical Research	Quantitative Research	121
	Qualitative Research	11
	Qualitative & Quantitative Research	20
Non-Empirical Research	Pure exploration of theoretical concepts, Analysis of literature or purely an introduction of system development architecture, technology or content	31

Table 4-2-3 shows that most of the e-Learning related papers published by Taiwanese academics in recent years (2001~2007) dealt with empirical research (around 5/6 of the total with 152 papers). Non-empirical research accounted for only 31 papers (around 1/6 of all papers). In empirical research, quantitative research formed the larger part (121 papers in total).

(IV) International Research Collaboration

This looks at whether the papers published by Taiwanese academics were produced in collaboration with authors from other countries (Table 4-2-4).

Table 4-2-4 shows that most e-Learning papers published by Taiwanese academics in recent years (2001

2007) were not the result of international collaboration.

Table 4-2-4: Analysis on "International Collaboration" in e-Learning Papers, 2001~2007

Theme	Description	No. of Papers (Total = 183)
International Research Collaboration	International collaboration	4
	No international collaboration	179

II. Analysis and Discussion of Taiwanese Academic Papers on e-Learning

Further analysis of the publication situation in the periodicals revealed the following:

(I) On the Development of e-Learning Theory

Constructivism is an important theoretical basis for e-Learning in Taiwan. The systems and teaching perspectives derived from constructivism emphasize the ability and process of understanding and constructing knowledge. It also emphasizes the framework provided by the collaborating learning process. Evaluation-wise, the emphasis is on the integration of assessment and instruction. The assessment results serve as feedback for the learning process and in turn, drive instruction.

(II) On Research Topics

Most e-Learning research (62%) in Taiwan is on "system development". e-Learning is, however, just a part of the educational environment, so system research should be considered merely the start. How to examine the system from the perspectives of the student, teacher and practical on-site applications in order to make improvements to the system's content, interface, framework and function determines whether e-Learning may be successfully introduced in the future.

On a broader level, factors such as the student, teacher and practical on-site applications must also take the background context into account. A similar view had already been proposed by Liang[3] in 2001.

Nevertheless, research into how system development research can be integrated with research into practical on-site applications remains very limited.

Additionally, as the systems increase in maturity and diversity, the next challenge becomes how to integrate these different systems on-site. Another important topic to consider is how schools should integrate and select these systems while taking funding and site conditions into account. This, however, also leads to another problem: as the designs of these systems are usually based on specific functional or educational requirements, they tend not to support the requirements of most systems in the first place. This reduces their likelihood of general adoption.

(III) On Applicable Level of Education

Most current developments are concentrated in tertiary education, but if the system's market potential is taken into account, while tertiary education offers the most autonomy it is also more difficult to achieve significant market size. Elementary, secondary and adult education (incl. enterprise training), on the other hand, may offer more market potential. More attention should therefore be paid to system research and development at the elementary and secondary levels.

(IV) On Research Methodologies

Of the 183 academic papers, 121 chose to adopt a quantitative research methodology. Quantitative research provides the system designers with basic feedback, but the system must ultimately operate in an actual educational environment. Relying on quantitative research alone may not be enough to acquire the wealth of information available in the actual complex and variable environment. This means qualitative research will gradually take on a more important role for e-Learning research in Taiwan in the future.

(V) On International Research Collaboration

According to data, almost 98% of all periodical papers were produced through independent research in Taiwan. While this showed that Taiwan has the ability to carry out independent research, more collaborative research will help expand perspectives in Taiwan and draw more attention to the research results produced by Taiwanese society.

3 Liang, C. C. (2001). Guidelines for distance education: A case study in Taiwan. Journal of Computer Assisted Learning, 17(1), 48-57.

4.3 International Comparison of Academic Research on e-Learning

I. International Comparison of Taiwanese e-Learning Academic Paper Publication

According to the Phase I project summary published by the National Science and Technology Program Office for e-Learning (http://elnpweb.ncu.edu.tw/home.aspx), Taiwan is now ranked third for published e-Learning related papers in important international periodicals in terms of both quantity and the number of citations behind only the U.K. and the U.S.

Table 4-3-1 shows Taiwan's international ranking in the number of published e-Learning papers at the six major e-Learning periodicals listed in Table 4-3-1. Table 4-3-2 shows the international ranking of Taiwanese papers in terms of the number of times they were cited in the SSCI periodicals.

Table 4-3-1 Ranking for Total Number of e-Learning Related Papers Published in Important International e-Learning Periodicals (2001.1.1~2007.12.31)

	No.1	No.2	No.3	No.4	No.5
C&E	England (115)	USA (86)	Taiwan (52)	Australia (27)	Netherlands (21) Spain (21)
JCAL	England (99)	Taiwan (52)	USA (30)	Netherlands (21)	Australia (17) China (17)
ET&S	USA (78)	England (31)	Taiwan (30)	Greece (25)	Canada (24)
ETR&D	USA (186)	Netherlands (21)	Canada (8)	Australia (7) South Korea (7)	Taiwan (1)No.13
IETI	England (101)	Australia (20)	Taiwan (16)	Scotland (12) USA (12)	Netherlands (10)
BJET	England (215)	USA (88)	Australia (73)	Scotland (53)	India (34) Taiwan (30)No.7
Total	England (561)	USA (48)	Taiwan (181)	Australia (161)	Netherlands (121)

Note: 1. The number of papers published by academics from each country is shown in parentheses
2. The total number of Taiwanese papers here was 181 as two book review articles were excluded.

Source: ISI Web of Science

Table 4-3-2 Ranking for Total Number of Citations for e-Learning Related Papers in Important International e-Learning Periodicals (2001.1.1~2007.12.31)

	No.1	No.2	No.3	No.4	No.5
C&E	USA (249)	England (171)	Taiwan (150)	Netherlands (101)	Greece (81) Spain (42)
JCAL	England (188)	Taiwan (156)	USA (69)	Scotland (54)	Netherlands (53) Australia (51)
ET&S	Netherlands (48)	England (38)	USA (34)	Greece (28)	Taiwan (21)
ETR&D	USA (473)	Netherlands (91)	Australia (43)	South Korea (18)	England (8) Taiwan (0)
IETI	England (66)	Taiwan (30)	Australia (12)	USA (9)	Scotland (6)
BJET	England (271)	USA (98)	Australia (64)	Netherlands (60)	Taiwan (57) Scotland (26)
Total	USA (932)	England (742)	Taiwan (414)	Netherlands (357)	Australia (98)

Note: The number of times papers published by academics from each country were cited is shown in parentheses

Source: ISI Web of Science

Also, when the classification table proposed by Shih, Feng & Tsai's[4] "cognitive studies" was applied, the 181 Taiwanese papers published in international journals, a comparison of papers with non-system development topics and the international trend data acquired by Shih et al. revealed two important points: First, both international and Taiwanese papers emphasized the "interactive learning environment" in the "learning environment". This was probably due to the very distinctive difference between e-Learning scenarios and traditional learning scenarios. Second, the biggest differences between Taiwanese international papers were in "Message Handling" and "Teaching-Orientation". Taiwanese academics published virtually no papers in some of the sub-categories for these two aspects even though these two areas have a strong relationship with students' learning and teachers' teaching. Taiwan should therefore pay more attention to these two groups.

II. Analysis of Influential Journal Papers

Though 62% of Taiwanese e-Learning research papers were on the topic of system development, in terms of cumulative citations and the average number of citations per year, system analysis related research

4 Shih, M., Feng, J., & Tsai, C. C. (2008). Research and trends in the field of e-Learning from 2001 to 2005: A content analysis of cognitive studies in selected journals. Computers & Education, 51,955-967

did not account for a high proportion of citations. This may be due to the fact that research discussing systems tend to be focused on a particular system functionality or educational context, making them less generally applicable. Such a result suggests the need to invest more effort into other types of e-Learning related research.

III. International Collaboration and Influence

With international academic exchanges and the support of the ELNP, Taiwan has become an important community hub for e-Learning research, with many world-class research teams showing interest in collaborating with Taiwanese teams. Taiwan has also hosted many international academic symposiums on e-Learning and this has helped to effectively boost Taiwan's international visibility. At the same time, academic research in Taiwan have also been recognized with awards from credible international organizations and subsequently patented. For example, the Pocket SCORM mobile learning tool developed by the Industrial Development Bureau (IDB) in conjunction with a local university won the bronze medal in the Brandon-Hall Excellence in Learning Awards for technological innovation, making Taiwan the first Asian country to win this honor.

4.4 Influence of Academic Research on e-Learning, Education and the Industry

This section will introduce the promotion of the ELPN academic research results, the influence of the ELPN on education and the influence of the ELPN on industry.

I. Promotion of Academic Research Results

(I) Research Team Exchanges

The ELPN Phase I hosted a learning science research community forum in support of local academic symposiums and set up four special interest groups (SIG) for specific research fields. The ELPN also invested in the cultivation of basic research expertise required for the academia and industry.

(II) Databank and Online Platform (http://e-Learning.nutn.edu.tw/)

To collate and promote the research results from the ELPN, the " Portal of Promotion for National e-Learning Project " was set up. The website consisted of two main fields: databank and results platform. The databank featured a SIG section, a trans-disciplinary collaboration section and an IT education papers section; as for the results platform, it included an industry-academic collaboration section, and the ELPN results section and an IT education results section.

(III) Publication of Results and Promotion in Schools

To popularize the results of the ELPN research, the " Conference of Basic Research in National e-Learning Project " was held once each in northern, central and southern Taiwan in 2007. Four workshops were also held to promote the application of the research results in the actual teaching environment for education workers.

(IV) Promotion of Industry and Academic Collaboration

An "Industry-Academia Forum" was held based on the research topics selected for promotion in order to promote industry-academia exchanges in e-Learning; an "Industry-Academia Collaboration Requirement" questionnaire survey was also distributed to learn more about the industry's needs. At the same time, the hosting of industry-academia collaboration seminars provided a channel to match the industry with

academia so they can work together to develop successful collaboration.

II. Influence of ELPN Academic Research on Education

(I) Passing and Revising of Relevant Legislation

To promote e-Learning, the Ministry of Education revised the crediting guidelines for e-Learning and allowed the proportion of e-Learning hours to increase from 1/3 to 1/2. Trials were also conducted on 100% e-Learning in-service master's programs so students can study through e-Learning. At the same time, the "Implementation Regulations Regarding Distance Learning by Universities" was also drafted to provide the implementation of e-Learning with a legal basis.

(II) Promoting Changes in Teaching Methods

The ELPN offered incentives to encourage the acceptance of expert/academic assistance and supervision in order to promote reforms in teaching methods. These took the form of the "applied digital learning centers, "creation of blended teaching methods that integrate the real and the virtual" and "expansion from the individual level to the enterprise level". These initiatives were of significant benefit to personal development, employment and improving the quality of the nation's manpower.

(III) Formation of a Diversified Learning Environment

e-Learning is now in widespread use among universities, colleges, senior and vocational high schools, and even junior high and elementary schools as well. As a result, Taiwan won 3 gold medals, 4 silver medals, 4 bronze models and 14 commendations in the Asia-Pacific Economic Cooperation's (APEC) junior high and elementary school online collaborative learning event. This provided clear proof that the ELPN has helped to boost the ability of schools at all levels to utilize next-generation processing capabilities.

At the same time, the ELPN incentives, assistance and support has seen many e-Learning providers emerge to supply a large variety of professional services, products and innovative teaching models. For example, the Learning House's clever combination of online learning, group/class-interactive teaching and learning through play; Hi-kids company incorporated cartoon animation, interactive games and sing-a-longs to help children have fun learning; or Gjun's use of digital learning centers to provide the best adult education service. Apart from the above, many local universities also set up e-Learning master's programs and general knowledge courses so e-Learning has now become a well-established part of the formal education system.

(IV) Bridging the Learning Divide between the City and the Countryside

A variety of online courses were produced by each government department according to their own area of responsibility. The emphasis was on “self-initiated learning”, “customization” and “online community discussions”. The government departments also cooperated with private organizations to promote the set up of physical digital learning centers to bridge the divide between the city and the countryside.

Additionally, the Ministry of Education set up a variety of online counselor training classes to recruit school counselors involved with the online school counseling projects for remote areas as well as IT volunteers from universities. The online platform system was also used to provide distance education to in-service junior high and elementary schools teachers on offshore islands and remote areas to meet their needs for continuing education. Government departments at all levels also set up various “e-Schools”; the National Palace Museum and the county/city departments of education cooperated on the “Museum-School Collaborative Education Development Project “ as well. The Council for Hakka Affairs also developed the “Distance Learning Courses about Hakka Language and Culture” for universities in order to promote Hakka language and culture at an academic level in young students.

(V) Development of e-Learning Techniques and Expertise

The National Science Council and the MOEA Department of Information Technology led the research and development of e-Learning techniques. The goal was to conduct basic research and develop new technologies to attract people from different fields and get them involved in e-Learning R&D. Technology transfers and industry-academia collaboration could then used to stimulated industry development. The R&D expertise will also circulate in the industry, government and academia, boosting Taiwan’s overall R&D ability.

(VI) Improving e-Learning Quality

The ELPN defined a three-level quality scheme for e-Learning quality. This provided developers with a set of guidelines to follow and improve their quality. For example, LiveABC’s interactive conversational English encyclopedia was awarded the Award for Creative e-Learning Product (A) (International) by the MOEA in December 2004. It was also released in Korea and was awarded first prize for learning content by the Korean Ministry of Education.

(VII) Digitization of Language Education

The main goal of the “e-Learning for Chinese Language Project” is to develop high-quality Chinese e-Learning products, research and expertise in Taiwan. The Project is expected to train over 300 Taiwanese

Chinese teachers so they are equipped with e-teaching skills; over 50 Chinese related vendors will work together to develop Taiwan-branded Chinese e-Learning projects; through sub-projects, set up learning websites, online courses, training courses and learning centers. The goal is to have more than five million people take part in language e-Learning every year and make Taiwan the key research bastion for those who wish to take Chinese as a second language.

III. Influence of ELPN Academic Research on Industry

Through industry-academia collaboration as well as technology and patent transfers, the ELPN has provided the e-Learning industry with the powerful R&D support it needs to grow. In technology transfers alone the NSC's ELPN had technology transfer projects with the industry and is also actively promoting the digital content industry-academia collaboration project. Requests for research proposals are issued twice a year, and these have already made a major impact in areas such as language & culture education, children and youth education counseling, tertiary education and human resources management. or

4.5 Conclusion

Based on the above explanation and analysis, the development of e-Learning in Taiwan can generally be categorized into three phased missions: “System Development”, “On-Site Integration” and “Large-scale Promotion”.

I. Task Developments in Each Phase

(I) “System Development” Phase

Development is relatively complete at the current stage but continued advances in technology will open up the possibility for new functions. The system must therefore continue to be revised, and apart from IT expertise, education-related knowledge needs to be improved as well.

(II) “On-site Integration” Phase

At the moment, this is an e-Learning area not yet been fully realized yet in Taiwan. The most important task is therefore to boost research into students, teachers and the education site. The second-most important task is to strengthen research at all levels from individual, family, school, community, and society to the world. The third-most important task is to develop more education content that can be used in a system based on all kinds of academic knowledge and their properties. By taking into account the differences in the nature and processes of each academic discipline, develop a consistent and unified curriculum. Fourth, more critical general research should be conducted such as examining e-Learning from the perspective of “social justice” and “liberation”. e-Learning should not be treated as an end in itself as this may lead to the neglect of social problems caused by differences in power and resources.

(III) “Large-Scale Promotion” Phase

Practical on-site conditions and system functions should be progressively screened to select a system that can be applied immediately; different systems can also be integrated and combined with the teaching site; through government-provided framework and funding, carry out research into e-Learning; develop more teaching content that may be used in the system based on the knowledge and properties of different academic disciplines.

II. Policy Recommendations

In the end, future policy should continue to offer incentives for e-Learning technology applications and innovations; encourage individual and general research in students, teachers and educational context so that in the future, e-Learning in Taiwan may be practiced at all levels of the education system. At the same time, encourage IT researchers, education researchers and actual frontline workers to collaborate together; promote research into the "long-term" integration of the systems into the teaching site rather than expecting results in the short term; and finally, support the formation of international research collaborations.