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21st Century Public Libraries : Vision and Reality

論 文 集
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Cultural Heritage in the Digital World *

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I am grateful to Director Cheng of the National Taichung Library and also the Office of the Council for Cultural Affairs for inviting me to be at this important meeting. I know that most of you already had wonderful week in different parts of Taiwan discussing various future aspects of public libraries in this new millennium. I am very sorry for not being able to participate in that part of the activities. With all the possibilities of the digital world today, how I wish that I could do so virtually from Singapore. You see, I just rushed in last night from Singapore after giving a keynote speech at the CONSAL Meeting.

In the last two years, I have spoken so often in Taiwan to so many different groups of professionals and different types of organizations. Being a very consistent person, where and what I stand for in terms of the roles of libraries in the digital networked knowledge society has been a wide open-book because I have spoken and published on this topics widely. So, since I have the opportunities to speak with the emphases on "public libraries" this time, I wondered myself what additional aspect I can bring in. As a result, I have chosen to speak on "cultural heritage in digital

world" so that I can relate some of my own experience to convince you, if not already, the importance of this work. This topic is chosen because I truly have been passionate about this subject, and also have felt strongly the public libraries' significant role in locating, preserving, organizing, and disseminating information related to its own cultural heritage. The current "digital" environment has made it possible for public libraries to do this job not only well, but also to have impact far beyond their own geographical boundaries, regardless whether they are located in the metropolitan or remote areas, in a rich or poor country.

Why Passionate About Cultural Heritage?

Personally, I have been taught at home when I was young that our roots are the foundation of our lives, and thus the importance of family, history, etc.... As the Chinese saying goes, "when you drinks the water, you need to remember where you come from." For this reason, I have never forgot my roots, and have professionally back up this believe with actions throughout my professional careers in various aspects, to contribute what I can as a "return" to what I have received...

For example, fifteen years ago, when I was suggested to explore the use of interactive videodisc technology to the humanities, Egypt was mentioned because at that time I just returned from Israel and the forever-mysterious Niles. That is a country with such rich cultural heritage. Despite of my lack of knowledge in the humanities areas, I rejected the suggestion, and chose to do something related to the Chinese cultural heritage, because China is equally culturally rich. That innocent decision based on my belief has substantially changed my professional life in the last 16 years. Most of you know that I refer to my *First Emperor of China* project, which since then has been over-exposed with much international coverage. With my heavy involvement in that project, I could see where the future will take us. So, as early as 1994, I advocated "Moving Toward A Digital Knowledge Base" as shown in Figure 1 (Chen, 1994).

Figure 1. Images of the first two pages of Chen's article in *Multimedia Today*

This Emperor project has not only given me a focus in following the new information technology development in the last decade and half, but also has started my long affair with cultural heritage in general, and Chinese culture heritage in particular, and thus has made me a better world citizen. With this background, I have learned to appreciate the multi-cultural dimensions of our world. I have truly understood that each nation has its own precious culture and heritage, which can not be downgraded by anyone else. Even for the poorest countries in the world, they become the richest of all when we are looking for the culture heritage resources of those countries. This is why I have been "crusading" in recent years the need for each nation to be proud of its own culture heritage and to take advantage of the current digital technological advances to preserve, organize, and share their treasures. Regardless whether I was in South Africa, or in Vietnam, or in New Zealand, I have made efforts to articulate the importance of culture heritage in digital world (Chen, 1996, 1998, 1999).

America's National Projects

The importance of culture heritage to the well being of citizens is not felt only by me as a personal passion. In fact, it has been widely recognized and promoted at the highest level. In the US, for example, let me cite the following two examples to show that both the White House and the Library of Congress are actively involved in locating, preserving, and disseminating American cultural heritage as we turn to this new century. They also mobilize public libraries at all levels – state, city, and small

town libraries, museums, historical societies, and archives to these activities, since much of the temporary "lost" or "hidden" treasures are spreading all over the country.

America's Millennium Project – Honor the Past and Imagine the Future

In 1998, in preparation for the new millennium, the White House, under the leadership of the First Lady, led a national cooperative Millennium Program of the White House Millennium Council, the Smithsonian Institution, and other agencies. The theme of America's Millennium was to honor the past and imagine the future.

During the millennium year (January 1, 2000 to January 1, 2001), it will be a program that have engaged Americans in a wide variety of activities and initiatives designed to highlight the American heritage and celebrate its creativity. This program includes demonstrations, performances, and the like.

Library of Congress Bicentennial Celebration

The America's Library of Congress was founded April 24, 1800. It is the nation's oldest federal cultural institution and the world's largest library. According to Library of Congress, it preserves a collection of 119 million items. In addition to its primary mission of serving the research needs of the U.S. Congress, the Library serves all Americans through its popular Web site and in its 22 reading rooms on Capitol Hill. Its National Digital Library, American Memory, has shared American culture heritage with the world.

This month Library of Congress celebrated its Bicentennial. Many celebration programs and events have taken place. One of which should be of special relevancy to us.

• Special Programs - Local Legacies

"The Local Legacies Project created the opportunity for citizens to participate in the Library of Congress Bicentennial celebration. Working through their U.S. Senator or Representative and with hometown libraries, folklife organizations and other cultural institutions and groups, Local Legacies participants documented America's grassroots heritage in every state, the U.S. Trusts and Territories, and the District of Columbia. Their documentation provides a snapshot of the nation's unique traditions as we begin a new century.

Over the past year, Local Legacies teams documented the creative arts, crafts or customs that represent traditional community life; signature events such as

festivals and parades; how communities celebrate local and national historical events; and the occupations that defined the community life. Photographs, written reports, sound and video recordings, and miscellaneous materials such as newspaper clippings, posters, and flyers were sent to the Library of Congress to become a permanent part of the collection of the American Folklife Center. Selections from this material will be digitized and made available through the Library's Web site, enabling Americans to learn more about our country's diverse culture." (http://www.loc.gov)

A sampling of photographs and brief description of the Local Legacies projects received to date is available at:

www.loc.gov/bicentennial/propage/prohome.html. (Figure 2)

Figure 2.   Library of Congress's Bicentennial Celebration with its Local Legacy etc…

These are just two sample programs at the highest national level to show the importance of culture heritage, and how federal efforts have been made to locate, preserve, organize, and disseminate information on the "local legacies". In these efforts, local public libraries are playing a key role in the process.

CMNet: US-Sino Collaborative Research Toward a Global Digital Library on Chinese Studies

Many of you know, I have been advocating the Global Digital Library (GDL) for over a decade, long before we knew the Internet as a common global network

earlier than we celebrated the 60th Anniversary of the National Central Library here in Taipei in 1993 (Chen, 1999). The early vision for GDL was that when the high-speed global communications networks are available to connect the distributed "digital" multimedia knowledge bases in different parts of the world, then we can have the GDL with the richest resources on earth, unmatched by any large traditional libraries. Obviously today's technology is making such connections possible, but problems and issues surrounding digital libraries are too numerous to make such GDL functional as a true digital library even though digital contents are available, which is not yet. Also, when multi-countries are involved, the problems are even more complex. To improve the current situation, we need more interactions and discussions on common problems, we need more collaborative research across national borders, and we need to share our expertise. Thus, any kind of international digital library programs should play a very significant role since they are intended to do just that.

In the US, there are many digital library activities, which I clearly have no time to discuss them. I shall mention only the R&D programs of the National Science Foundation. In contrast to the more "operational" oriented activities, NSF has concentrated its effort early in the research and development areas. Its Phase 1 Digital Libraries Initiatives (DL-1) was a four-year $24-million program ended in the end of 1998. DL-1 supported high-end research activities of 6 major universities sponsored mainly by NSF, DARPA, and NASA. They are:

1) Carnegie Mellon University
2) Stanford University
3) University of California at Berkeley
4) University of California at Santa Barbara
5) University of Illinois
6) University of Michigan

The NSF's Digital Libraries: Phase 2 (DL-2) program started in 1998 with another 4-5 years with about $8-$10 million dollars per year. Its activities have the following emphases:

- **research** - refined technical scope; extend to new areas and dimensions in the DL information lifecycle
- **testbeds** - for DL research with added emphasis on interoperability & technology integration
- **content/collections** - increased emphasis on content, collections development and management
- **infrastructure** - operational DLs with collections of value to domain and other

"communities" of users

- **context** - understanding DLs in domain, economic, social, international contexts; DLs as HuCS (see Chen 1999 for more information).

In addition to these programs, NSF initiated a brand new program called International Digital Library Program (IDLP) in the end of 1998. As global library/museum/archive activities springing up everywhere in the world, IDLP is intended *to encourage productive interchange of knowledge and data around the world, prevent the development of fragmented digital systems, and create synergetic collaborative environment for digital information sharing.* The IDLP is supported by the Division of Information and Intelligent Systems of the Directorate for Computer and Information Science and Engineering, and the Division of International Programs of the Directorate for Social, Behavioral and Economic Sciences. It builds on and extends and extends on efforts in digital libraries research of NSF.

NSF 99-6 Announcement of this program states: "IDLP hopes to contribute to the fundamental knowledge required to create information systems that can operate in multiple languages, formats, media, and social and organizational contexts. To achieve this, collaborative creation of new research understandings, tools and ideas exploiting the different opportunities offered by materials and technologies in use in different countries is strongly encouraged."

So, clearly, taking advantage of the global network connections, digital library R&D work is taken to the larger scale and context (see Figure 3). The IDLP solicitation first came out in January 1999.
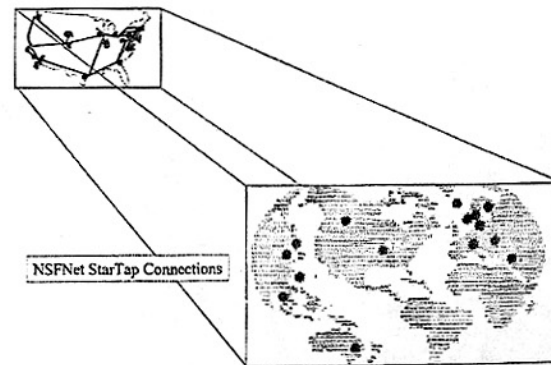

NSFNet StarTap Connections

Figure 3. NSFNet StarTap Connections

I responded to the solicitation with a proposal called *CMNet (Chinese Memory Net): US-Sino Collaborative Research Toward A Global Digital Library in Chinese Studies*, hoping to work toward a functional GDL in Chinese studies by achieving it through the US-Sino collaborative research in Chinese studies. NSF received more than 50 proposals with more than 25 countries involved. I am delighted that the proposal on CMNet will be one of the few among the large number of competitive proposals to be funded by NSF. I will be the Project Director. The collaborative partners will initially involve multi-interdisciplinary researchers, faculty, librarians from Tsinghua University and Peking University in Beijing; Jiao-tong University in Shaighai; National Taiwan University, Academic Sinica National Tsinghua University, and others in Taiwan; and Cornell University, University of California in Berkeley, and University of Pittsburgh in the US.

Clearly, Chinese cultural heritage will be a significant part of the content areas utilized to collaboratively explore the many difficult problems and issues facing us. Among them, the following are a few obvious ones, such as:

- Interoperable multilingual information systems;
- cross-language retrieval systems;
- multiscriptural and multicultural interfaces;
- distributed digital libraries including sound, data, text, image, and video;
- interoperability and scalability technology to permit large world-wide collections;
- digital content development;
- preservation and archiving of digital scholarly information, including technology and procedures for long-term information asset management;
- social aspects of digital libraries and cross-cultural context studies;
- use of digital libraries at all levels of instruction; metadata techniques and tools;
- economic and copyright issues: authentication, rights, and fair use; and
- electronic publishing and scholarly communication technology, including collaboratories, online repositories, and new methods of organizing knowledge distribution.

Aside from those, which are "Chinese" specific, many others are common unsolved problems and issues related to "digital libraries" which are begging for more research and development.

I hope that the project will expand after the initial phase to include more researchers of similar interests from other institutions and countries. It is also my hope that this research can serve as one of the models for other international collaborative research activities in digital libraries. This project has not yet been

officially announced at the time of this writing. Therefore it is to soon to report on the potential impact of this international project. However, it is fair to expect that when we manage to tackle the essential research topics related to digital libraries with such type of international synergetic and interdisciplinary groups, it is hopeful that consensus can eventually evolve to produce workable "standards" and methods. We will then be one step closer to the realization of a real GDL on Chinese studies.

Cultural Heritage and the Digital Museums and Digital Archives Programs of the National Science Council

Moving to the home base in Taiwan, most of you must know of the programs of the National Science Council.

1. Digital Museum Program

The following information is extracted from the NSC's website (http://www.nsc.gov.tw/y2k/dml/mainindex.html):

The NSC is sponsoring a "digital museum" project as part of the "Greeting a New Millenium—A 21ˢᵗ Century Science Development Program with Concern for the Humanities as a Main Theme." With this project the NSC hopes establish a model website featuring culture, art, science, and technology, and stimulate a trend towards placing content consisting knowledge and cultural materials on the Internet, so that it is accessible to all regardless of time, distance, culture, or physical ability. It is hoped that this content will enrich people's lives, promote a global outlook, and allow everyone to enjoy the fulfillment of lifelong learning. The NSC also hopes that the promotion of a "digital collections" will encourage the development of domestic multimedia and a content industry.

The "Digital Museum" project was inaugurated in July 1998, and has received close attention of the Chairman of NSC, Dr. Jenn-Tay Hwang, who has advocated throughout his tenure the importance of integrating science and humanities, and the need to use science and technology to benefit mankind. Because of his endorsement, the program has been quite handsomely supported with NT$60,000,000 (about US$2 million) for the first year and NT$75,000,000 (about US$2.5 million) for the second year.

You are all encouraged to visit the website for more programmatic information. But, in relating to the topics of this talk, "Cultural Heritage," as a NSC consultant, I have been privileged to watch this

program developed and grow. I am and you would be too, impressed with the topics covered by some of the First Year projects. These include Tracing the Tamsui River to Its Source, Taiwanese Aborigines—The Pingpu Group, Butterfly Ecology from Every Angle, Native Plants and Fishes of Taiwan, Understanding Ancient Texts—The Written Knowledge Network, An Immortal Palace—Han Dynasty Culture and Burials, Firearms and Ming-Qing Dynasty Warfare, etc. The 12 projects selected from some 90 proposals for Year 2 have also considerable cultural coverage. These include topics such as The Beauty of Chinese Art, The Tamsui River, Taiwan Native/Folk Artists, The Lan-Yu Bio-Cultural Diversity, Treasures of the Palace Museum, to name just a few.

In addition, the enormous efforts made by NSC to support groups of researchers in environment development to facilitate further development for digital work, such as the development of Taiwan's own metadata systems modifying from Dublin Core is a significant step. You will hear more from Profs. Hsueh-hua Chen and Kuang-hua Chen of National Taiwan University, and Prof. Chao-chen Chen of the National Normal University and the National Central Library on this topic. Other efforts will include the tool development for addressing security problems related to digital information, and others.

2. International Cooperation

(1). Partnership with NSF's IDLP Project, CMNet

Realizing the significant of international cooperation, NSC has been leading in this front, and has long and fruitful collaborative relationship with American's NSF on a variety of research activities in many science and engineering fields.

In the digital library area, in continuing its international cooperative culture, NSC is enthusiastically supporting all collaborative institutions with the first such type of international project from the American's NSF, my CMNet project as mentioned earlier from the early time of the proposal writing. The Taiwan collaborators to be supported by the NSC are in the midst of brainstorming for their research agenda. I appreciate greatly the enthusiastic support of Chairman Hwang and Vice Chairman Chang, and the strong effort of Dr. San-Cheng Chang, the Head of the NSC's Planning and Evaluation Division of NSC until April 10, 2000.

(2). APEC Digital Museum Initiatives

In addition to this major international activity, another exciting one in the Asian Pacific region is a brand new APEC (Asian Pacific Economic Cooperation) Digital Museum Initiative: Information Technology for Sharing Humanistic Contents proposed by NSC at the Industrial Science and Technology Working Group Meeting at Pattaya, Thailand on 14-17 March, 2000 and accepted by the APEC-ISTWG. The proposal shared by Dr. S. C. Chang indicates clearly that this initiative shared strongly what NSF' IDLP hopes to achieve globally, similar wordings can be found, such as it is intended to "help avoid duplication of effort, prevent the development of fragmented digital systems, and encourage productive interchange of scientific knowledge and scholarly data around the world" and many others. But, this proposed program differs in approaches. It will concentrate more on workshops, symposiums, and publications with activities that all member economies of the APEC can contribute. These were advocated by those senior administrators participated at the ASCA/NIT Joint Program supported by NSC in Taipei, August 16-21, 1999. Most of the countries represented are also APEC member economies (see Figure 4, also, Chen 1999a, pp. 463-508).

Thus, also details of this initiative yet to be worked out, it answers some of the wishes of those senior administrators from Asian Pacific Countries, as clearly articulated at the ASCA/NIT meeting in 1999. It also works well synergetically with the CMNet initiative, which does hope to expand its collaborative efforts to beyond the current US-Sino level. Dr. S. C. Chang's effort in this area deserves proper recognition.

由中華民國主辦的1999年亞洲科技合作協會（ASCA）科技資訊管理研討會暨第11屆新興資訊科技國際會議，於本年8月16日在台北科技大樓揭幕，行政院國科會主任委員黃鎮台博士代表中華民國主持開幕致辭。前排右七為主任委員黃鎮台博士，右六為副主任委員薛香川博士。（國科會）

Figure 4. ASCA/NIT Representative of 15 Countries Discussing IT and Global Library Development

3. Digital Archive Program

At the 9th Electronic, Information, and Communications Strategic Meeting of the Executive Yuan on July 5, 1999, Minister Yang of SRB announced that one of the focused activities of Taiwan's NII will relate to the rich and multi-faceted networked Chinese information contents. In discussing the importance of making the rich government information contents available in digital form and available on the Internet via the value-added efforts from the industry, he announced:

> *"We are proposing the "National Digital Archive Plan" (「國家數位典藏機制」), and hoping to digitize all the treasures of the government owned archives. With the industries' added-value effort in using these digital resources through network like Internet, we can disseminate Chinese culture and share our invaluable cultural heritage with our own citizens as well as the world."*
> (http://www.nii.gov.tw/action/a880705.htm)

This "National Digital Archive Plan" (「國家數位典藏機制」was approved, and NSC is to implement this plan. At the time of this writing, the "Digital Archive" program is still in process. The initial figure of the funding level is many times larger than that of the Digital Museum Program. According to the planning document, 「國家典藏數位化」計畫規劃案, the main purpose of the program is:

> *"To digitize various kinds of significant national archives, and to enhance them for both practical and research use, in order to promote better social and scholarly benefits."*

Under this plan, seven organizations will make their digital archival proposals that will be reviewed by a panel of experts for funding. This review process is still on going at the time of this writing.

If the projects can go beyond the digitization level, and truly find ways to create powerful knowledge bases for the use of both general public and scholars, then the potentials will be great. I expect that much of the projects proposed will be heavily on areas related to local and Chinese cultural heritage.

CCA/NSC Collaborative Program – 文化機構文獻館藏數位化先導示範計畫

1. Background

In addition to these exciting Programs of the NSC, let me now share with you another exciting cross-agency program, if you are not already aware of this yet.

Many of you may still remember my *NIT '99: The 11th International Conference on New Information Technology* held at the National Central Library (NCL) in August 18-20, 1999 (Chen, 1999), cosponsored by the Ministry of Education, Chinese Library Association, the National Central Library, and National Science Council, with Dr. Margaret Fung as the Local Chair. After that conference, I accepted the gracious invitation of Director Chuang to give an opening keynote speech at the Chinese Database Conference (*Conference on Cooperative Development of Chinese Bibliographic Databases, August 31-September 1, 1999*) at the end of August. Because of my keen interest in advocating the "digital cultural heritage" activities in Taiwan, Dr. Chuang and I discussed my interest in the local cultural centers in Taiwan. He enthusiastically shared my interest and most generously arrange one-week study trip for me during the period between the two conferences with the company and help of his able staff, Ms. Chia-ning Chiang, Head of the NCL's Government Division. We had a very packed week visiting and discussing with many cultural center directors and staff, government officials of the Central Office of the Council of Cultural Affairs, several major library directors and staff—including Mr. Cheng and his staff, directors and staff of several significant local museums, and others. A list of these organizations visited is included in Appendix 1.

2. Local Results of the Visits

This was a very gratifying one-week trip that has yielded many noticeable results in a surprisingly short-time period. I am most grateful to the cultural center directors and staff, and colleagues of other organizations visited for sharing with me their honest thoughts, comments and suggestions. Let me share with you a few examples:

1) Most directors of the cultural centers visited were first quite skeptical about the digital connection and their local cultural heritage. In fact, some were quite critical of all the "digital" activities at the central government level, and expressed that "there is a considerable distance between information technology and ordinary people's lives, and the current technological activities have not reached the common people (資訊科技與人民生活有差距，只是上層的活動未普及達到生活化"). I sensed clearly their frustrations, and understood their criticisms and wishes. In fact, some of my own feelings were validated. Yet, communications is the key to many

activities. By my being there, and they sensed my sincerity. I noticed the immediate change of attitude within a short 2-hour visit to some centers — from lukewarm and polite reception to sincere and enthusiastic desire to participate. Some of the directors have personally expressed strong desire to pursue the "digital" activities. They realize that they are in a vibrant "digital" society, and cultural centers must use information technology effectively to play a significant role in order to be viable. Yet, there are genuine concerns, which are worthy for our serious consideration, and need to be addressed. Let me share with you some of the "concerns and wishes" as summarized in the following:

- We must have a standard process;

- We wish that the central government agencies could plan an unified standard for digital work. Just like "cars on the same track, books with the same language", organizations like the Council of Cultural Affairs and the Ministry of Education, for example, should have more efforts on this;

- We wish that the central government agencies could plan to bring our products and results to the international stage;

- We wish that there were multi-agency and multi-functional plans, so that the local centers can provide the relevant resources;

- We wish that there was a unified metadata format;

- We wish that there was a unified planning;

- Digital work needs to be planned at the national level so that they can be shared globally;

- We wish that Taiwan's digital library plan can have a "global" plan;

- We need more funds;

- We need technical supports.

2) I am enormously impressed by the rich local cultural resources, and share the urgency to preserve, organize, repackage, utilized, and disseminate these rich resources digitally so that they can be utilized effectively and also shared globally. For example, according to the information sources given to me, Taipei County Cultural Center (台北縣立文化中心) has several hundred volumes of historical archives related to the Taipei County during the periods of Ching Dynasty and the Japanese occupation, while Yi-lan County Cultural Center's (宜蘭縣立文化中心) Yi-lan County History Library (宜蘭縣史館) has over 30,000 Japanese newspaper clippings, and its Taiwan Opera Center (台灣戲劇館) has over 7000 volumes of traditional opera books, thousands of traditional opera records, and over 200 traditional videotapes. Each has its own local characteristics and treasures. Much of those are either only partially revealed through printed sources or not yet utilized. I will not be surprised to see that some of these became the candidates of the Digital Archive proposal(s).

3) This trip enabled me to have an opportunity to discuss more in depth with the officials of the Central Office of the Council of Cultural Affairs and the staff of the National Taichung Library on the future development of "digital libraries" and the role of public libraries in involving in this development. Some staff also accompanied me to other visits. I was happy that after the visit to these colleagues responded my calls with great enthusiasm and resonant interests. Although the public library automation and network activity budget of the Year 2000 was already set, yet with the specific endorsement of library section head of the CCA's Central Office, Ms. Siu-mei Huang, and the approval of the advisory committee, modifications were able to be made to include the "digital" activities for the public libraries. As a result, as indicated in the program of this conference, some digital library activities are included in the Year 2000 activity planning with experimental projects with the local cultural sources of the counties of Yi-lan (宜蘭), Taipei (台北), Hsin-chu (新竹), Kao-shung (高雄), and Pingtong (屏東), as well as the city of Taichung (台中). Furthermore, "digital library" is included in the discussion topics of this conference to introduce the more unified concepts of digital libraries both in and outside of Taiwan to the participants, as well as to better prepare the public libraries to start actively plan and develop digital related work in order to benefit from the country's over-all strategic plan and to bring public libraries to the new horizon of the digital world. The leadership from Ms.Huang, Director Cheng and staff of National Taichung Library is commendable.

3. Multi-Agency Cooperative Model

Going beyond the above most encouraging results, something more sustainable, cross agency and at the higher level is needed in order to fulfill some of the wishes expressed by some of the local cultural center directors. As indicated in Appendix 1, I sought to brief as many government leaders as possible. Shared with my enthusiasm, Dr. Chuang accompanied me to visit Chairwoman Lin of the Council of Cultural Affairs (Figure 5), and I brief Vice Premier Liu and Chairman Hwang of the National Science Council.

Figure 5. Accompanied by Dr. Chuang, meeting with Chairwoman Lin of CCA

With their endorsement on some of my ideas, I returned to the US to prepare specially a briefing document conceptually and operationally advocate a multi-agency cooperative program. This was presented to Chairwoman Lin, Chairman Hwang (Figure 6) and Dr. Chuang.

Figure 6. Several presentations to Chairman Hwang of NSC

Let me share with you the conceptual model for multi-agency collaboration on local cultural heritage as illustrated in the following (Figure 7):
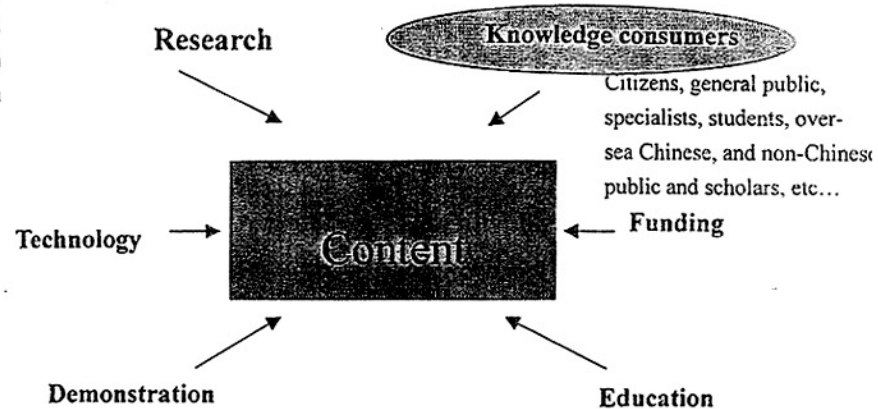

Figure 7. The conceptual model of a multi-agency collaboration

It should be clear from the figure, for cultural heritage, contents is most important and it needs to be digital. In order to transform the valuable digital contents to useful knowledge bases via network for various types of consumers, demonstration projects are needed to gain experience in creating digital library/museum/archive for more sustainable and lasting use, and research will be very significant in order that many barriers to successful global digital collection can be developed. Education will be significant to train the creators of the potential digital collection as well as the users and consumers of the digital products. Technology is essential but it is only a tool. Funding is a must but it can be used productively only when all the components are cohesively integrated together.

Take local cultural heritage as example, clearly contents are kept and owned by organizations under the Council of Cultural Affairs, but they lack of the expertise in technology and research. Thus, often these organizations have to contract out for technology application projects. On the other hand, universities and research centers supported by National Science Council do not have as much local resources and contents, but they have the research and technology expertise. Thus, collaboration is the answer!

Although the conceptual model implies the need for multi-agency cooperation

beyond the CCA and NSC, but at least for the meantime, if these two can cooperate, it is a very significant beginning. I was pleased to sense the strong approval from Chairman Hwang of NSC, and thus my effort seemed to have a happy ending.

4. The CCA/NSC Cooperative Program

In the last few months, with Chairman Hwang's strong endorsement, and the support of Vice Chairman Jin-Fu Chang of NSC, Dr. San-Cheng Chang and his staff, Dr. Mei-yu Wang (NSF), made strong effort in working with the Head of the First Division at CCA, Mr. Teh-Hsin Chen and the Head of MIS team at CCA, Ms. Yuan-Hwa Wang. Both Chairman Hwang of NSC and Chairwoman Lin of CCA agreed on the initiation of a joint CCA/NSC Collaborative Program on Cultural Heritage, guided by a document entitled 「文化機構文獻館藏數位化先導示範計畫」合作方案. The background of this program is stated in the document as follow:

文建會、國科會
「文化機構文獻館藏數位化先導示範計畫」合作方案

緣起

1. 網際網路日益普及，政府應亟思以其作為文化保存與散佈之工具，並積極開發相關數位化技術與文獻標準。

2. 文建會過去陸續推動「電子博物館」，逐年選擇國內特色文化課題，製作多媒體光碟，迄今已有「中國傢具博物館」、「編織博物館」、「木雕博物館」、「台灣前輩藝術家」等數種上網及製成光碟。

3. 國科會自八十七年起推動「數位博物館」專案，第一年已完成主題計畫八案，涵蓋文化與科學教育題材；另有技術支援計畫五案，涵蓋資訊與文獻基礎技術。此等技術支援計畫之成果，可作為文化題材數位化之技術參考標準，具有相當之應用延伸性。

4. 國內各文化機構具有相當質、量之文化題材，但數位化風氣、經驗均尚未普及，有相當之提升空間。

5. 美國白宮 PITAC（Presidential Information Technology Advisory Committee）顧問陳劉欽智博士曾於八十八年八月參訪各文化機構，已激發多數文化機構對文化素材數位化之認知與意願。

While details of this program is yet to be announced and implemented. The budget available will be modest in the beginning but the symbolic value of this

program is great. It is nonetheless an exciting but difficult one to work out. We need to thank both Chairwoman Lin of CCA and Chairman Hwang of NSC for their vision and support. The effort of the senior staffs of both organizations mentioned above deserve our thanks as well for making such a cross-agency program a reality.

Conclusion

In the time allocated to this paper, I believe I have covered a great deal, shared with you my thoughts and experience in the digital-related activities in US, globally, as well as in Taiwan, and have also brought all of you up-to-date with the exciting developments of great relevancy to your work in Taiwan.

The digital development in Taiwan will move faster than we would like to think, and possibly faster in many other parts of the world. The January 2000 issue of *Internet Taiwan: Newsletter of Internet Development in Taiwan* indicated that the Internet users in Taiwan grew to more than 4,54 million users in November 1999, and it was only 3.11 million in January 1999. With that speed, it is probably about 5 million users now. Of these, 55% of Net users have multiple accesses to the Internet.

As shown in Figure 8, taken from that issue, 79% of Net users access to the Internet at home, and among the highest rated main purposes the Net users using Internet in Taiwan is for browsing/searching (84%) and email (72%), with downloading software as the distant third at 39%. Learning was cited at 25%.
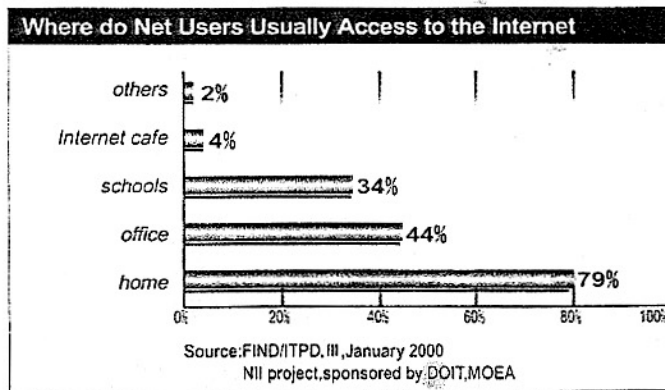
Figure 8. Where do Net users usually access to the Internet? (Taken from *Internet Taiwan*, January 2000, p.2)

The most popular (top ten) Internet contents are: Online newspaper (51%), technology (50%), travel (49%), entertainment (34%), investment (34%), products (31%), jobs (18%), arts (16%), health (15%), and online shopping (13%). Clearly, the challenges for librarians and educators are clear. I have stated the importance of culture heritage to the well being of the citizen. We must pause and think what all these "technology" applications are for! Technology is here, but where are the contents and how the contents are going to be used are vital questions to all of us.

At the dawn of a new political election Taiwan, I am aware of the coming of a new cabinet in another 20 days. Despite of these changes, I would like to welcome the future in Taiwan with optimistic anticipation. The President Elect Chen Shui-bian has repeatedly stressed the importance of preserving and disseminating local cultural heritage in his campaign pledges, and there is every reason to believe his positive and decisive directives in this area.

President Elect Chen has named Dean Y. S. Chen of the National Taiwan Normal University to be his Chairman Woman of CCA. According to the News reports, she clearly feels the inadequacy of confidence in local cultural, and strongly believes in investing long-term effort to promote national and local culture and art in order to stimulate more local creativity. Thus, there is also every reason to believe that she will value the role of digital technology to help her to accomplish her agenda and goals.

Hopefully the best is yet to come!

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APPENDIX 1. Organizations Visited by Ching-chih Chen (August 23-28, 1999)

桃園縣立文化中心博物館 － 李淯崧主任
台北縣立文化中心博物館 － 潘文忠主任
彰化縣立文化中心
嘉義縣立文化中心 － 秘書余假珊小姐、博物館吳靜修館長
宜蘭縣立文化中心 － 林德福主任、宜蘭縣史館、台灣戲劇館
南北管音樂戲曲館 (彰化縣) － 張釗騰館長
鹿港民俗文物館 (彰化縣) － 施雲軒專員

文建會中部辦公室 －行政秘書鄭宣棠、黃秀梅股長等
臺灣省文獻會 － 鄧憲卿副主任委員、整理組蕭富隆組長
國立台中圖書館 (1) － 程良雄館長
國際暨南大學 － 項潔院長
南台科技大學 (台南) － 教務長邱明源先生、圖書館楊智晶館長

口頭向劉副院長報告

專程拜訪行政院文化建設委員會林澄枝主委
訪談心得就教於 國家圖書館莊芳榮館長
專程拜訪行政院國家科學委員會黃鎮台主委