# 99 年人文教育革新中綱計畫
# 子計畫三 人文領域人才培育國際交流計畫

## 【補助類型-國際學術研討會】
## 【2010 圖書資訊學蛻變與創新國際研討會】

## 期末成果報告

指導暨補助單位：教育部
指導單位：教育部顧問室人文領域人才培育國際交流計畫辦公室
執行單位：國立臺灣師範大學圖書資訊學研究所
計畫主持人：卜小蝶教授
執行日期：99 年 7 月 1 日至 99 年 12 月 31 日

中華民國 99 年 12 月 31 日

# 目　錄

## 一、計畫名稱

2010 圖書資訊學蛻變與創新國際研討會

## 二、計畫目標

在知識經濟社會中，知識的創造與應用，遠較實體資源運用重要。透過創新，知識能為個人、組織、社會源源不斷創造價值及提升競爭力。面對知識社會環境的變遷，圖書資訊學領域由關注圖書資訊的保存、整理、檢索與取用，逐漸走向知識的典藏、加值、萃取與利用。同時，面對數位化、多元化、全球化的知識資源與使用者，圖書資訊學的學科範疇、教育內涵、專業發展等都面臨極大挑戰。

美國圖書館學家 Melvil Dewey 於 1887 年創立了第一所圖書館學院，圖書資訊學已歷經百餘年的發展。過程中面對各類環境的改變，其學科與專業總能在每一次變革中成長，繼續為滿足人類知識需求而前進。進入二十一世紀，面對數位化與網路化潮流及知識社會需求的轉變，圖書資訊學也面臨變革挑戰。特別是自 2005 年起在歐美地區，陸續一些知名的圖書資訊學系所亟思轉變，建立起所謂的 iSchool (information School)聯盟，其強調跨領域與多元化學科發展，揭櫫資訊(Information)、人(Human)、科技(Technology)為其學科核心；與傳統重視圖書、讀者、圖書館的 lSchool (library School)形成相當對比，也引發不少關注。

圖書資訊學對於人類知識社會的發展扮演重要角色，展望未來，如何不斷蛻變與創新，亟須集思廣益。臺灣師範大學圖書資訊學研究所聯合 School of Information Studies, University of Wisconsin – Milwaukee, USA、School of Communication & Information, Nanyang Technological University, Singapore，及中華民國圖書館學會與中華民國圖書資訊學教育學會等學術機構與組織，共同舉辦國際學術研討會。希望邀集國內外重要學者專家，針對圖書資訊學之學科範疇、教育內涵、專業發展等面向之蛻變與創新，進行互動與對話。特別是邀請歐美亞洲等地於 iSchool 聯盟扮演重要領航角色的學者，分別以社會、文化、教育、專業、研究等觀點發表論文及專題演講(Invited Talk)，分享其經驗與洞察。同時，會中也將邀請國內學術界與產業界學者專家以論壇方式(Panel)，發表其對圖書資訊學學科及專業發展的觀察與期許，透過產學多元觀點的分享與討論，激發創新思維。此外，會中也將規劃英文海報論文徵稿與發表(Poster)，鼓勵圖書資訊學與資訊科學相關系所師生及資訊服務機構專業人員，以英文發表其研究成果及進行互動，以進一步獲取國際交流經驗及增進國際化能力。主要目的包括：

- 促進圖書資訊學相關領域之國際學術交流。
- 激發圖書資訊學學科發展之多元觀點與創新思維。
- 提升圖書資訊學及資訊科學相關系所師生及資訊服務機構人員之國際化能力。

## 三、執行情形

本次研討會於99年11月16-17日假國立臺灣師範大學圖書館國際會議廳（台北市和平東路一段129號）舉行。詳細議程如下：

（一）會議議程

**99年11月16日（星期二）**

| 時　間 | 議　程 |
|---|---|
| 08:40-09:10 | 報到 |
| 09:10-09:30 | 開幕及致詞 |
| 09:30-10:30 | 專題演講一<br>主講者：Gary Marchionini, Cary C. Boshamer Professor, School of Information and Library Science, University of North Carolina – Chapel Hill; President, American Society for Information Science & Technology, USA<br>講　題：Toward Participatory Digital Libraries<br>主持人：陳雪華 / 臺灣大學圖書資訊學系教授兼圖書館館長；中華民國圖書館學會理事長 |
| 10:30-10:50 | 茶敘 |
| 10:50-11:50 | 專題演講二<br>主講者：Johannes Britz, Interim Provost & Vice Chancellor for Academic Affairs; Former Dean & Professor, School of Information Studies, University of Wisconsin-Milwaukee, USA<br>講　題：The End of Information Poverty? Setting a Global Moral Agenda to Combat Information Poverty<br>主持人：黃鴻珠 / 淡江大學資訊與圖書館學系教授兼圖書館館長 |
| 11:50-14:00 | 海報論文展 |
| 14:00-15:00 | 專題演講三<br>主講者：Christopher Khoo Soo Guan, Programme Director, MSc (Information Studies) and Associate Professor, Division of Information Studies, School of Communication & Information, Nanyang Technological University, Singapore<br>講　題：Developing an Asian Vision of Library & Information Research<br>主持人：林珊如，臺灣大學圖書資訊學系教授 |
| 15:00-15:20 | 茶敘 |
| 15:20-17:20 | 專題論壇一：學術界對圖書資訊學教育及學科發展之觀察與期許<br>主持人：Diane H. Sonnenwald, Head of School, Professor, School of Information and Library Studies, University College Dublin, Ireland<br>吳美美 / 臺灣師範大學圖書資訊學研究所教授<br>與談人：(依姓名筆劃序)<br>• 宋雪芳 / 淡江大學資訊與圖書館學系副教授<br>• 阮明淑 / 世新大學資訊傳播學系副教授<br>• 邱銘心 / 臺灣師範大學圖書資訊學研究所助理教授<br>• 陳志銘 / 政治大學圖書資訊與檔案學研究所副教授<br>• 黃元鶴 / 輔仁大學圖書資訊學系副教授<br>• 謝吉隆 / 臺灣師範大學圖書資訊學研究所助理教授<br>• 藍文欽 / 臺灣大學圖書資訊學系助理教授<br>• 蘇小鳳 / 中興大學圖書資訊學研究所副教授 |
| 17:20 | 第一天議程結束 |

## 99 年 11 月 17 日（星期三）

| 時　間 | 議　程 |
|---|---|
| 09:30-10:30 | 專題演講四<br>主講者：Harry Bruce, Dean and Professor, The Information School, University of Washington, USA<br>講　題：The Audacious Vision of Information Schools<br>主持人：朱則剛 / 臺灣大學圖書資訊學系教授兼系主任；中華圖書資訊學教育學會理事長 |
| 10:30-10:50 | 茶敘 |
| 10:50-11:50 | 專題演講五<br>主講者：Pia Borlund, Dean of Research, Professor, Department of Information Studies, Royal School of Library and Information Science, Copenhagen & Aalborg, Denmark<br>主　題：The Case of the Royal School of Library and Information Science: A European iSchool<br>主持人：林麗娟 / 輔仁大學圖書資訊學系教授 |
| 11:50-13:30 | 午餐（請自理） |
| 13:30-14:30 | 專題演講六<br>主講者：Shigeo Sugimoto, Professor, Graduate School of Library, Information and Media Studies; Former Director, Research Center for Knowledge Communities, University of Tsukuba, Japan<br>主　題：Digital Library Research and Information Schools - a Personal View of i-Schools Movement Since Mid 90's<br>主持人：林志鳳 / 世新大學資訊傳播學系副教授 |
| 14:30-14:50 | 茶敘 |
| 14:50-16:20 | 專題論壇二：產業界對圖書資訊服務專業發展之觀察與期許<br>主持人：Christopher Khoo Soo Guan, Programme Director, MSc (Information Studies) and Associate Professor, Division of Information Studies, School of Communication & Information, Nanyang Technological University, Singapore<br>陳昭珍 / 臺灣師範大學圖書資訊學研究所教授兼圖書館館長<br>與談人：（依姓名筆劃序）<br>• 林芳吟 / 頑石創意總經理兼創意總監<br>• 康芳菁 / Yahoo!奇摩搜尋分類服務事業部產品總監<br>• 張雪梅 / 聯經出版事業公司總經理<br>• 張善政 / 宏碁電子化巨架構事業單位副總經理<br>• 劉永平 / 聯合線上總經理 |
| 16:30-17:00 | 綜合座談暨頒獎<br>主持人：卜小蝶 / 臺灣師範大學圖書資訊學研究所教授兼所長<br>柯皓仁 / 臺灣師範大學圖書資訊學研究所教授兼圖書館副館長 |
| 17:00-17:10 | 閉幕式 |

## （二）學術活動舉辦情形

本次研討會從籌劃到完成長達一年，具體達成效益說明如下：

### 1. 拓展國際學術交流，提升國際能見度與合作契機

本次研討會有 260 名國內外圖書資訊學相關領域師生及專業人員參與。除台灣本地，參與國家包括美國、丹麥、愛爾蘭、日本、新加坡、泰國、印度、菲律賓、澳洲、紐西蘭、香港等十一國人士。大會所邀請專題演講對象以目前在圖資領域具有影響力之學者為主，包括：(1)美國 3 位：資訊科學領域最重要學會之一的美國資訊科學與技術學會(ASIS&T)會長 Gary Marchionini 教授，其同時也是 University of North Carolina-Chapel Hill 資訊與圖書館學院院長；近年來引領圖資學科與教育變革的核心聯盟 iSchool 主席 Harry Bruce 教授，其同時也是 University of Washington 資訊學院院長；及圖資研究產能名列前茅的 University of Wisconsin-Milwaukee(UWM)前資訊學院院長 Johannes Britz 教授，其現任 UWM 副校長。(2)歐洲 2 位：歐洲地區最具規模的丹麥皇家圖書資訊學院資訊科學系 Pia Borlund 教授；及愛爾蘭 University College Dublin (UCD)圖書資訊學系主任 Diane Sonnenwald 教授，二者皆為歐洲 iSchool 聯盟代表學校。(3)亞洲 2 位：籌劃亞洲地區 iSchool 之 CiSAP 聯盟主導學者日本筑波大學 Shigeo Sugimoto 教授；及跨學科整合具代表性的新加坡南洋理工大學傳播與資訊學院資訊科學系系主任 Christopher Khoo Soo Guan 教授。上述學者，特別是 Marchionini 及 Bruce 教授對圖資學科與教育發展扮演關鍵性角色，這是圖資界首次邀請到他們來到台灣，十分不易。

藉由本次研討會，能與國際知名學者齊聚交流，不僅思維能與國際同步；同時也有助提升台灣學術界之能見度及創造國際合作契機。與會者對本次研討會多表滿意，特別是許多國外與會者為首次造訪台灣，對台灣能有此規劃完善、引領前瞻議題探討的國際學術會議皆頗感讚賞。此外，大會也安排受邀講者至其它圖資相關系所進行交流，包括臺灣大學圖書資訊學系、政治大學圖書資訊與檔案學研究所、輔仁大學資訊管理學系、淡江資訊與圖書館學系、及世新大學資訊傳播學系等。主辦單位臺灣師範大學圖書資訊學研究所與 UCD 預計明年春季進行跨國視訊合作教學，其它系所也有具體學術交流合作協議進行中，可預見未來合作成果豐碩。

### 2. 促進跨校及產學對話，引領前瞻議題及開拓新視野

圖資領域一向重視多元化發展及跨界合作，本次研討會參與籌辦單位來自國內外超過十所以上學校及機構，無形中已形成跨領域、跨校及跨國之交流與合作模式。特別是國內 8 所圖資系所有超過 40 位教授參與本次會議進行，包括會議籌備、場次主持、論文審查、論壇與談等，涵蓋了各校資深與新進教授，這也是

圖資界少見不同世代能同聚一堂的盛會，也突顯世代傳承的意義。此外，論壇二邀請了 5 位數位出版、數位內容、及網路服務公司之高階決策者，針對圖資專業與職涯發展之機會與挑戰，提出需求建言與勉勵。這些產業高階決策者是首次有機會與圖資領域師生及專業人員接觸，藉此學界與產業界彼此有更深的瞭解。透過跨校教師的多元觀點、及學術界與產業界的對話，有助與會者激發創新思維及感受創新變革力量，進而開拓新的視野。

在諸多探討議題中，對圖資領域未來發展具有重大影響力的 iSchool 理念與風潮，是國內外相關領域近來相當關心的議題，而這也是首次在台灣圖資界正式地進行探討。本次研討會能邀請到美國、歐洲、亞洲地區的關鍵人物，透過其提供的一手資訊與經驗分享，不僅有助相關領域進行反思，也有助於新觀念的普及，對台灣圖資界具有相當大的啟發，也深具意義。

**3. 增進圖資領域師生及專業人員國際化能力，提升人才素養**

為讓國內師生及專業人員在地即有機會與國際知名學者即時互動，本次研討會安排了英文海報論文展。經徵稿及審稿過程，共計有來自 5 國 41 位作者的 16 篇英文海報論文展示。所發表主題豐富多元，特別是台灣的作者群，多為第一次以英文口述發表，雖然緊張生澀，但多表現大方。會後其多表示不論是會前的準備，或是在會中實際進行講解，整體過程收獲良多，是平日課堂或工作機構所無法提供的學習機會。也有國內與會者提到，此次研討會是圖資界少見真正具有國際互動的研討會，不僅止於邀請國外講者，更鼓勵所有與會者直接以英語互動，獲取國際交流經驗，相當難得。

除與會者得以在地獲取國際交流經驗，主辦單位臺師大圖資所的工作人員尚包括 25 名碩博士生。在會議的籌辦過程，其參與了宣傳、編輯、場務、接待等工作。協助國際會議的進行，其不僅獲得外語能力的訓練，更能提升問題解決及團隊合作能力。特別是本次研討會，有來自不同國家的與會者，學生們需學習與不同語言文化的與會者溝通協調。本次研討會從籌劃到完成長達一年，對工作人員而言，不僅拓展了國際視野及培養國際化能力，也從中學習到國際學術會議的諸多細節，並進一步提升其參與國際學術活動之動機與能力。

（三）活動照片

與會講者及貴賓合照


會場及報到

開幕致辭

- 臺灣師範大學教育學院周愚文院長
- 中華民國圖書館學會陳雪華理事長
- 中華圖書資訊學教育學會朱則剛理事長



專題演講

**Speech I**

Speaker: Gary Marchionini, President, ASIS&T; Professor and Dean, School of Information and Library Science, University of North Carolina–Chapel Hill

Topic: *Toward Participatory Digital Libraries*

**Speech II**

Speaker: Johannes Britz, Interim Provost & Vice Chancellor for Academic Affairs, University of Wisconsin-Milwaukee

Topic: *Information Poverty: The Development of a Global Moral Agenda*

**Speech III**

Speaker: Christopher Khoo Soo Guan, Programme Director and Associate Professor, Division of Information Studies, School of Communication & Information, Nanyang Technological University, Singapore

Topic: *Towards an Asian Vision of Library and Information Research*


**Speech IV**

Speaker: Harry Bruce, Dean and Professor, The Information School, University of Washington, USA

Topic: *The Audacious Vision of Information Schools*

**Speech V**

Speaker: Pia Borlund, Professor, Royal School of Library and Information Science, Denmark

Topic: *The Case of the Royal School of Library and Information Science: A European iSchool*

**Speech VI**

Speaker: Shigeo Sugimoto, Professor, Graduate School of Library, Information and Media Studies; Research Center for Knowledge Communities, University of Tsukuba, Japan

Topic: *Digital Library Research and Information Schools - a Personal View of i-Schools Movement since Mid 90's*

**Special Panel Talk**

Speaker: Diane H. Sonnenwald, Head of School, Professor, School of Information and Library Studies, University College Dublin, Ireland

Topic: *LIS: An Infrastructure Domain*

海報論文展

論壇一：學術界對圖書資訊學教育及學科發展之觀察與期許

- 宋雪芳 / 淡江大學資訊與圖書館學系副教授
- 阮明淑 / 世新大學資訊傳播學系副教授
- 邱銘心 / 臺灣師範大學圖書資訊學研究所助理教授
- 陳志銘 / 政治大學圖書資訊與檔案學研究所副教授
- 黃元鶴 / 輔仁大學圖書資訊學系副教授
- 謝吉隆 / 臺灣師範大學圖書資訊學研究所助理教授
- 藍文欽 / 臺灣大學圖書資訊學系助理教授
- 蘇小鳳 / 中興大學圖書資訊學研究所副教授

論壇二：產業界對圖書資訊服務專業之觀察與期許

- 林芳吟 / 頑石創意總經理兼創意總監
- 康芳菁 / Yahoo! 亞洲區 產品規劃部 產品總監
- 張雪梅 / 聯經出版事業公司總經理
- 張善政 / 宏碁電子化巨架構事業單位副總經理
- 劉永平 / 聯合線上總經理

會場互動

工作人員

## 五、執行成果分析與檢討

### （一）執行成果分析

以下先簡述專題演講內容重點，再進一步討論未來可推動之研究方向。在六場專題演講中，Gary Marchionini 教授首先提出數位圖書館的願景與展望，其中有關圖書館做為社會記憶機構（Memory Institutions）及促進個人記憶（Personal Memory）是相當具有前瞻性的思維，其也指出數位時代的圖書資訊服務事業，應鼓勵與促成個人參與及團體合作，進而建立起多元的數位風景(Milieu)，皆是值得關心圖資領域發展的人士反思。Johannes Britz 教授則針對資訊貧窮（Information Poverty）的議題，說明不同的定義，並進一步闡釋五種資訊權力平等的道德準則，為資訊社會研究者提供一更多元的分析架構，此外，其也指出解決資訊貧窮問題，並非給予人們更先進的設備，而是應該回到問題的本質，即資源、文化、教育與權力等基礎原則與建設才是需要關注的議題。來自新加坡的 Christopher Khoo Soo Guan 教授以書目計量方法，分析了亞洲地區圖資領域文獻的研究取向，並提出區域性（特別是亞洲）的學術交流與整合的必要性，對於一向追隨歐美研究的台灣圖資領域而言，的確提供了另一種觀點，值得省思。

其它三場演講主題分別介紹美國、歐洲、亞洲的 iSchool 發展近況與未來

展望。首先 Harry Bruce 教授介紹美國 iSchool 的背景與發展，其強調 iSchool 所呈現或期望達成的特色，包括跨學科（Interdisciplinary）、多樣（Diversity）、合作（Collaboration and Partnership）、卓越（Excellence and Distinction）、及領導（Leadership）；同時，由 iSchool 聯盟不斷嘗試重新定位及尋求願景的努力，Bruce 教授以大膽（audacious）來形容 iSchool 的願景其實是十分貼切；此外，iSchool 所關注與貢獻的領域，是以整個資訊時代的社會與產業為對象，而不僅限於圖資專業，充份展現 iSchool 變革與創新的企圖心，而這也是台灣圖資領域值得學習之處。來自丹麥的 Pia Borlund 教授，介紹難得一見的歐洲 iSchool 規劃與運作模式，令人印象深刻的是，丹麥人口數不及台灣四分之一，但國民生產毛額竟相去不遠，而唯一的丹麥皇家圖書館資訊科學學院，仍能藉由合作資源的運作，來改善其體制與社會認同，甚至其更致力於國際化，讓學域的整體思維及形象都能予以提升，小而美確實可行，這是台灣圖資領域可以做得更好的模範。最後來自日本的 Shigeo Sugimoto 教授則先由數位圖書館及日本圖資教育的發展談起，再介紹亞洲 iSchool 聯盟發展概況（即 CiSAP，Consortium of iSchool – Asia Pacific）；由於台灣與日本在文化上有許多相似之處，其圖資教育的諸多想法與做法值得台灣借鏡；而對於 CiSAP 的發展，其目前仍處於較自由彈性的合作模式，未來如何促進跨國的實質合作，則是充滿了機會與挑戰。

除了六場專題演講，二場學界及業界的論壇內容也相當豐富，學者及產業人士皆提出許多具前瞻性的研究議題與討論，相關報告資料可參考會議網頁：http://www.glis.ntnu.edu.tw/2010conference/agenda.htm。整體而言，每位講者及與談人所提出的見解或議題皆有獨到創新之處，而透過互動討論，也激發更多想像。諸多前瞻議題，皆值得進一步探究。如此豐富多層次的研討會內容及活動，也呼應了會議的主軸：圖書資訊學的蛻變與創新，也呈現出具體而微的 iSchool 風貌！

### （二）檢討

為瞭解本次會議成效，以提供未來舉辦類似活動之改善建議，會議工作小組於會後特別徵詢不同角色與會者之心得與建議，並進行檢討。簡要說明一些重點如下。對與會者而言，能在短短二天會議，聆聽到國際知名學者的專題演講及國內學界與業界論壇，同時又能參與即時互動的英文海報論文展，不僅是一舉數得的知識饗宴，同時透過互動也獲得不少啟發。在諸多回饋中，首先是對議程的豐富與多元表示肯定，例如「The symposium had a perfect balance of speakers from all sides -- very senior academics and researchers ... to a very well-balanced industry panel and most importantly a group of wonderful students」、「這次研討會不論是 Invited Speech 還是 Poster 的議題都非常的多元，比較不會整個侷限在同一個領域裡，讓我了解圖資還有許多神祕的樣貌等著我們去探索。」而受邀講者及與談人也有一些感受分享，例如「I was

impressed at how everyone was involved -- faculty from NTNU and other schools, students, & industry leaders」、「The symposium at NTNU was valuable for me to re-think the direction of our community (CiSAP)」、「I think we all learnt that there is a challenging but a very bright future for our profession; that we need to embrace changes, should focus on collaborations and sharing of knowledge; and we should encourage our students to be more innovative」、「透過國際會議，分享想法也學習別人的觀點，在互動中認識許多國內外同好，將對未來的研究與教學注入新思維與新動力。

對於英文海報論文展，也有許多迴響，一位資深的圖資專業人員提到：「我很喜歡這樣的展示，...，我總是認為同學要能夠用英文表達概念，就可以學會提綱挈領，這是研討會中很溫馨的感受，以往都是 Senior 的人不斷的說，這一次可以讓 junior 的人也可以有發聲地點，所以會場中場討論是熱烈的，可以看到不同的世代、不同的國家、不同的概念在中間串流，這是個很好的現象」；對實際觀摩的學生而言，見賢思齊更具影響力，例如：「海報論文展真的很吸引人，讓我看到許多有趣的想法和議題、新的研究趨勢和方向。覺得舉辦這種活動很有意義，提供一個舞台給大家發表，也讓大家有互相交流的機會，頓時覺得自己還不夠努力，能力也需要再加強，期許自己要不斷的學習，不斷的進步，最重要的是不要害怕改變！」而對實際展現海報論文成果的作者，其也有不同收獲，例如：「雖然之前已經聽過或見過許多同儕分享過論文海報的學術發表形式，但這卻是自己第一次實際親身參與。這次的經驗主要有兩種收穫：收穫一，是發現更多資訊呈現的形式。...。收穫二是，在不同的聽眾面前介紹自己的研究與結果，這讓我有機會能多考慮各種研究的面向。」最後，眾多的碩博士生工作人員，學習到學術會議的籌辦細節及團隊合作經驗，例如：「在這次的研討會中，我不只是學生的角色，也深入了研討會籌辦的各項過程，才知道原來辦理一個研討會需要這麼多、這麼繁雜的籌備工作，...。每位相關人員都是一個個重要的齒輪，一起努力才有辦法讓研討會運轉成功。」

## 六、 結論與建議

本次研討會邀請到國際知名學者來台，分享其對圖書資訊學學科與教育發展之經驗與洞察；也邀請到關心圖資專業領域發展的學術界與產業界人士，對圖資前瞻性研究議題與專業發展提出期許與建言；更安排了英文海報論文展示，提供師生及專業人員在地獲取國際經驗。與會者涵蓋多種層面，不僅有來自國內外的師生及專業人員聽眾，也有學術界與產業界的互動對話，十分難得。也由於本次研討會連結多層次的與會者，更能激發創新思維。特別是對圖資領域未來發展具有影響力的 iSchool 理念與風潮，藉由美國、歐洲、亞洲等地關鍵人物的一手資訊，不僅有助相關領域之參與，也有助新觀念的

普及，對台灣圖資界具有相當大的啟發與意義。

本次研討會從籌劃到完成長達一年，能如此順利圓滿，實有賴所有參與者的付出與支持。首先感謝以下單位在會議規劃與經費的支援，包括共同主辦單位：中華民國圖書館學會、中華圖書資訊學教育學會；合辦單位：Research Center for Knowledge Communities and Graduate School of Library, Information and Media Studies, University of Tsukuba, Japan、School of Information Studies, University of Wisconsin-Milwaukee, USA、School of Communication & Information, Nanyang Technological University, Singapore、美國資訊科學與技術學會台北分會、國立臺灣師範大學資訊工程學系、國立臺灣師範大學圖書館；補助單位：行政院國家科學委員會、教育部顧問室、臺灣師範大學研究發展處、臺灣師範大學教育學院、臺灣師範大學國際事務處、中華民國圖書館學會。再者，感謝 25 位來自國內外各圖資相關系所教授，分別擔任籌備委員會及議程委員會委員，讓議程規劃及英文海報論文審查工作得以順利進行；7 位受邀國外講者、13 位論壇與談人、10 位場次主持人、41 位英文海報論文的作者，是成就此次會議呈現多元風貌的主力。臺灣師範大學圖書資訊學研究所的 31 位師生及助教，擔任會議工作人員，眾人無私的付出是此次會議得以順利進行的幕後功臣。最後是來自國內外 260 位的與會者，其互動與回饋是舉辦此次會議的目的與意義之所在。

一些可以改善之處，最主要是會議場地的安排，由於本次會議舉辦地點以演講廳為主，且場地的使用時間有一些規定，造成英文海報論文展示的空間及時間都十分有限，多少影響參觀動線及互動效果。海報論文展示是學術會議中十分重要的活動，未來在舉辦類似活動，仍需尋求具有大量開放空間之場地，以利海報論文展示之配置；同時，也可安排較長時間，讓與會者有更多機會互動。另會議的延續性也是值得努力的方向，會中有與會者詢問是否會持續舉辦，由於此次研討會是自發性舉辦，未來若欲持續，可借鏡美國地區的 iSchool 聯盟年會，由圖資相關系所輪流與圖資相關學會共同主辦；同時，會中也可安排一些平行場次，讓更多講員有較充份時間介紹個人研究及進行交流；此外，會議結束後如何維持與會者的互動，也是值得深思的面向。

## 七、附錄

### （一）報名網頁及成果網頁樣式

報名網頁樣式


成果網頁樣式

（二）報名、報到學員清單

| 姓名 | 服務單位／與會身份 |
|---|---|
| GARY MARCHIONINI | 主講人 |
| JOHANNES BRITZ | 主講人 |
| CHRISTOPHER KHOO SOO GUAN | 主講人 |
| DIANE H. SONNENWALD | 主持人 |
| HARRY BRUCE | 主講人 |
| PIA BORLUND | 主講人 |
| SHIGEO SUGIMOTO | 主講人 |
| 林芳吟 | 與談人 |
| 康芳菁 | 與談人 |
| 張雪梅 | 與談人 |
| 張善政 | 與談人 |
| 劉永平 | 與談人 |
| 宋雪芳 | 與談人 |
| 阮明淑 | 與談人 |
| 邱銘心 | 與談人 |
| 陳志銘 | 與談人 |
| 黃元鶴 | 與談人 |
| 謝吉隆 | 與談人 |
| 藍文欽 | 與談人 |
| 蘇小鳳 | 與談人 |
| 陳雪華 | 主持人 |
| 黃鴻珠 | 主持人 |
| 林珊如 | 主持人 |
| 吳美美 | 主持人 |
| 朱則剛 | 主持人 |
| 林麗娟 | 主持人 |
| 林志鳳 | 主持人 |
| 陳昭珍 | 主持人 |
| 卜小蝶 | 主持人 |
| 柯皓仁 | 主持人 |
| 楊偲傑 | National Taiwan Normal University |
| 李堃瑛 | National Taiwan Normal University |

| 姓名 | 服務單位／與會身份 |
|---|---|
| 許鴻晢 | National Taiwan Normal University |
| 陳映竹 | National Taiwan Normal University |
| 謝易耿 | National Taiwan Normal University |
| 吳淑華 | National Taiwan Normal University |
| 林詣筑 | National Taiwan Normal University |
| 龐宇珺 | National Taiwan Normal University |
| 邱信一 | National Taiwan Normal University |
| 王怡璇 | National Taiwan Normal University |
| 張映涵 | National Taiwan Normal University |
| 林沂瑩 | National Taiwan Normal University |
| 黃煥棠 | National Taiwan Normal University |
| 魏曉婷 | National Taiwan Normal University |
| 廖家慧 | National Taiwan Normal University |
| 趙奕翔 | National Taiwan Normal University |
| 藍苑菁 | National Taiwan Normal University |
| 游忠諺 | National Taiwan Normal University |
| 張淇龍 | National Taiwan Normal University |
| 陳亞寧 | National Taiwan Normal University |
| 吳寂絹 | National Taiwan Normal University |
| 唐牧群 | 論文海報共同作者 |
| YI-JIN SIE | 論文海報作者 |
| PEI-NING LI | 論文海報作者 |
| SI-YIN WEN | 論文海報作者 |
| SHU-PING LEE | 論文海報作者 |
| 于第 | 論文海報作者 |
| 成維寧 | 論文海報作者 |
| 何亞真 | 論文海報作者 |
| 陳啟亮 | 論文海報作者 |
| 黃友惠 | 論文海報作者 |
| 王怡文 | 論文海報作者 |
| CHERN LI LIEW | Victoria University of Wellington |
| ELLI MO | Cathay Pacific Airways Ltd. |
| GOBINDA CHOWDHURY | UTS |
| JESSIE ROSE MALLANAO BAGUNU | University of the Philippines-National Center for Transportation Studies |
| KOKIL JAIDKA | Nanyang Technological University |

| 姓名 | 服務單位／與會身份 |
|---|---|
| LAMPANG MANMART | Khon Kaen University; CiSAP |
| MAKIKO MIWA | The Open University of Japan;CiSAP |
| MARY ANN M. INGUA | University of the Philippines Los Baños University Library |
| SHO SATO | Graduate School of Library, Information and Media Studies, University of Tsukuba |
| SIWANATH NUNTAPICHAI | Khon Kaen University |
| SMARN LOIPHA | Khon Kaen University; CiSAP |
| t.l. lee | LI MINS CO., LTD. |
| TSUN H. LEE | LEMANNS ENG. INC. |
| VILAS WUWONGSE | Asian Institute of Technology; CiSAP |
| 王如賓 | Taipei Community College |
| 王盈文 | Wesley Girls High School |
| 王梅玲 | National ChenChi University LIAS |
| 王祥安 | FJU |
| 王憲章 | National Kaohsiung Normal University Library |
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| 江朝貴 | Taipei Jingwen high school |
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| 吳怡瑾 | Fu-Jen Catholic University |
| 吳欣怡 | NTU |
| 吳政叡 | Fu-Jen Univ. |
| 呂智惠 | National Taiwan Normal University Library |
| 李央晴 | National Taiwan Normal University Library |
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| 李建南 | Colock Co.,(Ltd.) |
| 李庭慧 | National Chengchi University |
| 李淑霞 | Council for Economic Planning and Development |
| 李德竹 | National Taiwan University |
| 沈新民 | National Chin-Yi University of Technology |
| 卓玉聰 | Tamkang University |
| 周芷綺 | ntnu library |
| 林玉美 | Vanung University |
| 林利真 | National Taiwan Normal University Library |
| 林孟玲 | National Chiao Tung University |

| 姓名 | 服務單位／與會身份 |
|---|---|
| 林孟毅 | Fu Jen Catholic University |
| 林倩妏 | Tatung University Library |
| 林哲仁 | Self-Engagement |
| 林國勳 | MAAT, Academia Sinica |
| 林瑞雯 | Parliamentary Library, Legislative Yuan |
| 邱琦茹 | NCCU |
| 金冠羽 | Fu Jen Catholic University |
| 柯尚竹 | Executive Yuan Department of health Jilong Hospital |
| 洪詩淳 | TAMKANG University |
| 洪曉瑩 | NCCU |
| 紀瑪玲 | Parliamentary Library, Legislative Yuan |
| 胡錦華 | tamkang university |
| 徐福珍 | CIAN SHIH CO.,LTD. |
| 袁佩瑤 | Tamkang University |
| 袁筱麗 | Parliamentary Library, Legislative Yuan |
| 張俊玉 | Sungshan Community University |
| 張素蓉 | Tamkang University Library |
| 張純芸 | FU JEN CATHOLIC UNIVERSITY |
| 張迺貞 | General Education Center, Tatung University |
| 張珒垣 | NTUST |
| 張凱傑 | ntu |
| 張瑋純 | TAMKANG University |
| 張瓊文 | National Dr. Sun Yat-sen Memorial Hall |
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| 郭美蘭 | National Taiwan Normal University Library |
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| 陳怡蓁 | National Chengchi University (NCCU) |
| 陳冠至 | FU JEN CATHOLIC UNIVERSITY |
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| 陳淑貞 | National Taitung University |
| 陳莞捷 | NCCU |

| 姓名 | 服務單位／與會身份 |
|---|---|
| 陳惠君 | TEXAS ALOE |
| 陳雅琪 | National Health Research Institutes |
| 陳慶新 | Ling Tung University |
| 陳慧娉 | Academia Sinica |
| 陳寧 | National Taiwan University |
| 喬宗念 | Taipei National University of the Arts Library |
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| 黃素敏 | Keelung City Cultural Affairs Bureau |
| 黃淑貞 | Far Eastern Memorial Hospital |
| 黃湫淑 | Meiho University |
| 黃麗虹 | Computing Information Service Center, Institute for Information Industry |
| 塗欣宜 | Shengang Township Library, Changhua Country |
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| 楊昌倫 | Fu Jen Catholic University |
| 楊美華 | National Chengchi University |
| 鄒孟庭 | ChengChi University |
| 廖佩瑜 | National Taiwan University |
| 廖家明 | Tamkang University |
| 劉育銘 | TAMKANG UNIVERSITY |
| 劉昌柏 | TKU |
| 劉春銀 | Institute of Chinese Literature and Philosophy, Academia Sinica |
| 劉昫如 | National taiwan normal university |
| 蔡安婷 | FU JEN CATHOLIC UNIVERSITY |
| 鄭雍蓁 | TamKang University |
| 盧傳傑 | National Chengchi University |
| 蕭嬌麗 | National Health Research Institutes |
| 賴坤玉 | National Chi Nan University |
| 賴學淵 | Fu Jen Catholic |
| 謝其男 | Department of Library and Information Science, National Taiwan University |
| 謝珍妮 | Institute of Nuclear Energy Research |

| 姓名 | 服務單位／與會身份 |
|---|---|
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| 簡聖哲 | Fu Jen Catholic University |
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# 2010 International Symposium on the TRANSFORMATION & INNOVATION of LIBRARY AND INFORMATION SCIENCE

# PROCEEDINGS

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# PROGRAM

## Day 1: Tuesday, November 16, 2010

| Time | Agenda |
|---|---|
| 08:40-09:10 | Registration |
| 09:10-09:30 | Opening Remarks |
| 09:30-10:30 | Invited Speech 1 : Toward Participatory Digital Libraries<br>**Speaker :**<br>Gary Marchionini, Cary C. Boshamer Professor, School of Information and Library Science, University of North Carolina - Chapel Hill; President, American Society for Information Science & Technology, USA<br>**Session Chair :**<br>Hsueh-Hua Chen. Professor & University Librarian, Department of Library and Information Science, National Taiwan University; President, Library Association of the Republic of China (Taiwan), Taiwan |
| 10:30-10:50 | Refreshment Break |
| 10:50-11:50 | Invited Speech 2 : Information Poverty: The Development of a Global Moral Agenda<br>**Speaker :**<br>Johannes Britz, Interim Provost & Vice Chancellor for Academic Affairs, University of Wisconsin - Milwaukee, USA<br>**Session Chair :**<br>Hong-Chu Huang, Professor & University Librarian, Department and Graduate Institute of Information and Library Science, Tamkang University, Taiwan |
| 11:50-14:00 | Poster Exhibition / Lunch Break (Lunch on own) |
| 14:00-15:00 | Invited Speech 3 : Towards an Asian Vision of Library and Information Research<br>**Speaker :**<br>Christopher Khoo Soo Guan, Programme Director, MSc (Information Studies) and Associate Professor, Division of Information Studies, School of Communication & Information, Nanyang Technological University, Singapore<br>**Session Chair :**<br>Shan-Ju Lin Chang. Professor, Department of Library and Information Science, National Taiwan University, Taiwan |
| 15:00-15:20 | Refreshment Break |

| | |
|---|---|
| **15:20-17:20** | Panel Session I : Insights and Expectations of Library & Information Science Research : An Academic Perspective<br>**Moderators :**<br>• Diane H. Sonnenwald, Head of School, Professor, School of Information and Library Studies, University College Dublin, Ireland<br>• Mei-Mei Wu, Professor, Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan<br>**Panelists :** (List in alphabetical order)<br>• Chih-Ming Chen, Associate Professor, Graduate Institute of Library , Information and Archival Studies, National Chengchi University, Taiwan<br>• Ji-Lung Hsieh, Assistant Professor, Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan<br>• Ming-Hsin Phoebe Chiu, Assistant Professor, Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan<br>• Ming-Shu Yuan, Associate Professor, Department of Information and Communications, Shih Hsin University, Taiwan<br>• Sheue-Fang Song, Associate Professor, Department and Graduate Institute of Information and Library Science, Tamkang University, Taiwan<br>• Shiao-Feng Su, Associate Professor, Graduate Institute of Library and Information Science, National Chung Hsing University, Taiwan<br>• Wen-Chin Lan, Assistant Professor, Department of Library and Information Science, National Taiwan University, Taiwan<br>• Yuan-Ho Huang, Associate Professor, Graduate Institute of Library & Information Studies, Fu-Jen Catholic University, Taiwan |
| **17:20** | Day 1 End |

## Day 2: Wednesday, November 17, 2010

| Time | Agenda |
|---|---|
| **09:30-10:30** | Invited Speech 4 : The Audacious Vision of Information Schools<br>**Speaker :**<br>Harry Bruce, Dean and Professor, The Information School, University of Washington, USA<br>**Session Chair :**<br>Clarence Tsa-Kang Chu. Professor & Chairperson, Department of Library and Information Science, National Taiwan University; President, Chinese Association of Library & Information Science Education, Taiwan |
| **10:30-10:50** | Refreshment Break |
| **10:50-11:50** | Invited Speech 5 : The Case of the Royal School of Library and Information Science: A European iSchool<br>**Speaker :**<br>Pia Borlund, Professor, Royal School of Library and Information Science, Denmark<br>**Session Chair :**<br>Lih-Juan ChanLin. Professor, Graduate Institute of Library & Information Studies, Fu-Jen Catholic University, Taiwan |
| **11:50-13:30** | Lunch Break (Lunch on own) |
| **13:30-14:30** | Invited Speech 6 : Digital Library Research and Information Schools - a Personal View of i-Schools Movement since Mid 90's<br>**Speaker :**<br>Shigeo Sugimoto, Professor, Graduate School of Library, Information and Media Studies; Research Center for Knowledge Communities, University of Tsukuba, Japan<br>**Session Chair :**<br>Chih-Feng P. Lin. Associate Professor, Department of Information and Communications, Shih Hsin University, Taiwan |
| **14:30-14:50** | Refreshment Break |
| **14:50-16:20** | Panel Session 2 : Insights and Expectations of Library & Information Science Research : An Industry Perspective<br>**Moderators :**<br>• Christopher Khoo Soo Guan, Programme Director, MSc (Information Studies) and Associate Professor, Division of Information Studies, School of Communication & Information, Nanyang Technological University, Singapore<br>• Chao-Chen Chen. Professor & University Librarian, Graduate Institute of |

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| | Library & Information Studies, National Taiwan Normal University, Taiwan<br>**Panelists :** (List in alphabetical order)<br>• Shan-Cheng Chang, Deputy General Manager, eDC (Data Center), Acer, Taiwan<br>• Sheue-Me Chang, General Manager, Linking Publishing Co., Ltd., Taiwan<br>• Tricia Kang, Product Director, Search & Community Business Services, Yahoo!Kimo, Taiwan<br>• Fang-Yin Lin, President, Bright Ideas Design Co., Ltd., Taiwan<br>• Yong-Ping Liu, CEO of udn.com, Taiwan |
| **16:30-17:00** | Open Penal & Award Ceremony<br>**Session Chair :**<br>• Hsiao-Tieh Pu, Professor & Chairperson, Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan<br>• Hao-Ren Ke, Professor, Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan |
| **17:00-17:10** | Closing |

# Invited Speeches

# Toward Participatory Digital Libraries1[1]

**Gary Marchionini**
Dean and Cary C. Boshamer Professor, School of Information and Library Science
University of North Carolina – Chapel Hill, USA
President, American Society for Information Science & Technology, USA

## INTRODUCTION

Libraries collect, share, and preserve knowledge. Digital libraries continue this tradition but leverage the electronic technologies of computers, networks, and digital capture and storage to amplify and augment these functions. These augmentations in turn introduce new capabilities and challenges. The policies that guide library functions are driven by stakeholders. There is a continuum of stakeholders that range from all of humankind, through national or regional cultures, to local communities and eventually to individuals. Thus, we can talk about the abstract notion of a library of all of human knowledge that has no single physical library instantiation and aims to collect and organize everything. We can consider national libraries that aim to approximate all of human knowledge collected and organized through the lens of a particular culture and language. Likewise, we can talk about local or special libraries that are created and supported to serve the needs of a specific group, corporation, or industry. Finally, we can talk about personal libraries that individuals develop over a lifetime. As more of these different kinds of libraries exist in the Internet cloud, they make possible new kinds of purposeful and incidental synergies. One important development is that individuals are increasingly able to contribute to institutional libraries in both explicit and implicit ways. In this presentation, I argue that digital libraries are blurring the boundaries across these different stakeholder groupings, giving rise to participatory digital libraries where personal contributions meld with subsets of institutional collections in a dynamic confluence of information artifacts.

## ELECTRONIC TECHNOLOGIES CHANGE LIBRARY WORK

The techniques and technologies used to execute library functions related to collecting, sharing, and preserving knowledge and the information artifacts that represent that knowledge have changed rapidly in the electronic age. The following additions and changes illustrate just some of the ways that basic library operations have changed due to electronic technologies:

- Collection development decisions must include negotiating database licenses and automatic harvesting of metadata and information objects;
- Cataloging standards have expanded to include multimedia features, automatic metadata extraction, and patron-generated tags;
- Catalogs have moved beyond early dedicated OPACs to web-based portals with faceted access and novel user interfaces; that often are directly connected to primary materials (e.g., full text, scientific data);

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- Storage and management has leveraged powerful computational algorithms that offer content-based access to patrons and require advanced storage arrays and servers;
- Reference services have broadened to include cross-library collaborative via chat and other virtual communication channels, and social or automatic question answering services have augmented library reference provided by professionals;
- Library directors and managers have learned CIO and CTO functions to augment their information and human resources management skills.

## DIGITAL LIBRARIES AND PATRON PARTICIPATION

Institutional libraries have been strongly influenced by more than twenty years of digital library research and development. We have hybrid libraries in large academic research institutions that sustain large physical collections while offering parallel digital access and new kinds of digital collections and services. These institutional bricks and mortar libraries are joined by specialized digital libraries from publishers (e.g., ACM DL) and digital libraries of secondary content such as indexes (e.g., OCLC WorldCat; ISI Web of Science; Google Scholar). Today, even the largest libraries cooperate with and link to other institutional libraries.

In addition to these hybrid DLs, many kinds of born-digital collections and services have arisen ranging from dedicated DL projects such as Perseus or Open Video to e-science databases that take contributions from scientists such as Genbank, to the increasing number of citizen science projects that engage non-scientists to participate in data collection or analysis. Additionally, new kinds of participatory information services such as Wikipedia and various question answering systems such as Naver and Yahoo! Answers depend on people participating in information services. Collections of personal or group collections such as ibiblio (Jones, 2001) illustrate another kind of participatory DL. Figure 1 illustrates how institutional DLs as well as contributions from personal DLs are creating new kinds of participatory DLs.

The intention here is not to examine the many ways that libraries have evolved due to electronic technology but rather to focus on patron participation these changes makes possible. To do so, consider the human side of libraries. The digital age now spans three generations and the expectations about libraries are as much digital as physical. Because libraries are memory institutions for humanity, people are beginning to use library techniques to manage their digital lives and assets. Our personal memories increase in value as we age but we do not have good digital 'attics' to maintain the digital artifacts of our lives and we look to libraries to show us the way (e.g., see Kirk & Sellen, 2010). Libraries are themselves struggling to learn how to preserve digital artifacts and it makes sense that libraries and patrons can work together to foster new approaches to the challenges of digital persistence. InstitutionalDL(1)PersonalDL(2)PersonalDL(1)PersonalDL(n)InstitutionalDL(n)ParticipatoryDL

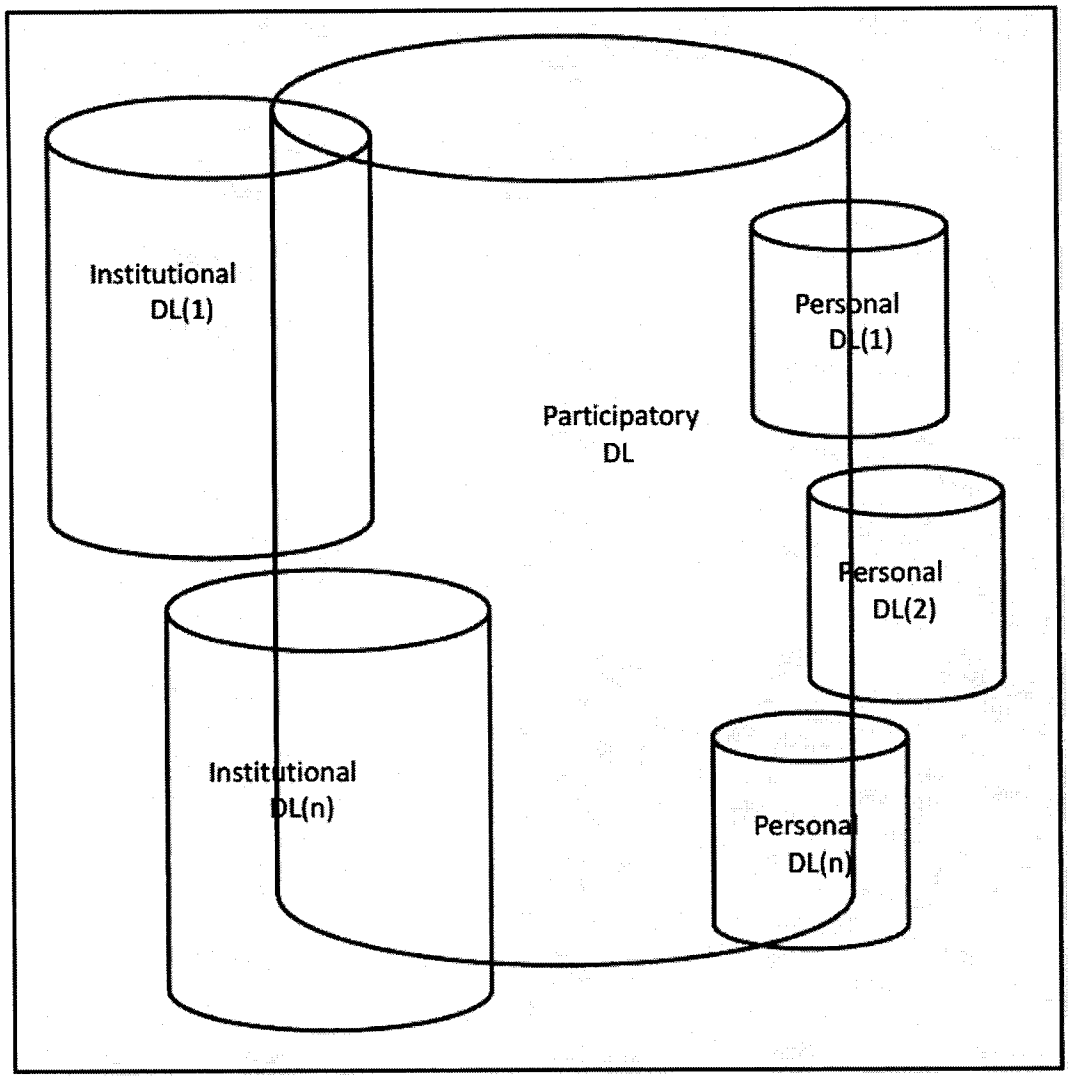


**Figure 1. Participatory Digital Libraries**

Digital libraries leverage patron participation in many different ways. The list below illustrates but a few examples of participatory DLs, each with a different set of policies and techniques. These policies and techniques range across several dimensions that include: Degree of dependence on extant or incoming streams of information; degree of curation and validation and associated techniques for establishing and maintaining trust; degree of openness to participation (who can participate); degree of automaticity used; and primary information functionality (creation, augmentation or validation, analysis).

Examples of different levels of participation

- Valley of the Shadow http://valley.lib.virginia.edu/ Contributions solicited physically
- Baltimore Learning Community [now defunct]. Content centralized, Teacher lesson plans and use notes contributed
- Networked Digital Library of Theses and Dissertations http://www.ndltd.org/ Student contributed work.

- National Central Library Taiwan: Digital Meta-Library http://www.ncl.edu.tw/mp.asp?mp=5 library consortium, members contribute metadata and objects
- arXiv physics preprints http://arxiv.org/ Registered users, contributor responsibility
- Worm Community System (and other scientific collaboratories) http://www.canis.uiuc.edu/projects/wcs/index.html Data sharing, some with embargo (e.g., dbGaP)
- Citizen science projects (e.g., http://www.birds.cornell.edu/netcommunity/citsci/ to track bird ecology, and http://www.oldweather.org/ for digitizing old ship logs for weather)
- SourceForge http://sourceforge.net/ Open Source code community
- Ibiblio http://ibiblio.org/index.html Contributor run DL with 1500+ collections
- Europeana http://europeana.eu/portal/ Member libraries, end user feedback
- Wikipedia- http://www.wikipedia.org/ Evolving policies
- What.cd for music sharing. Participation is payment

## THE SHARIUM DIGITAL LIBRARY MODEL

More than a decade ago, the sharium model of digital libraries was proposed by Marchionini (1999) and the different kinds of participatory DLs illustrate the robustness of this general conception of libraries in the digital age where a much broader range of resources and services are shared . Figure 2 illustrates the key functions supported in the sharium, many of which are common to today's participatory DLs. The DL as sharium supports public and private messaging, advanced search and discovery services (both individual and collaborative search with customizable and adaptive user interfaces), problem solving tools and services that support group interactions and analysis; active contribution services that support a variety of media and analog to digital tools); advanced presentation platforms that allow individuals and groups to perform or display their creations. The sharium DL depends on a flexible and scalable infrastructure that brings computational agents and human agents together around massive storage in the Internet (today's cloud computing cyberinfrastructure). Digital Library Channels Files Tools Contribution Contribution M e s s a g i n g Problem Solving/ Construction Problem Solving/ Construction Search/ Discovery Presentation Search/ Discovery Presentation The Sharium Work Space

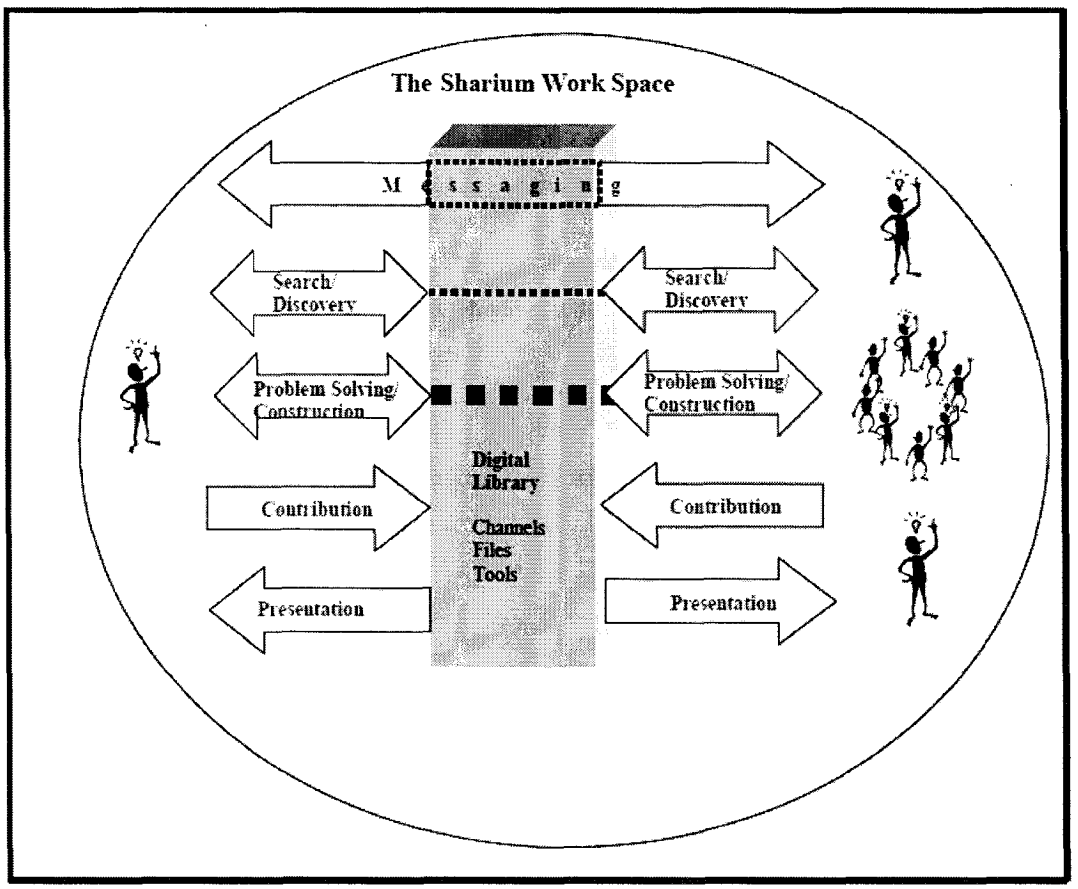


**Figure 2. The Sharium DL Model**

I suggest that we will continue to see more active participation by individuals as contributors to DLs, especially at local levels. Personal objects such as photographs, videos, audio recordings, text or aural blog or microblog (tweets) postings will increasingly become part of shared DLs. In the talk I illustrate this with examples of photographs in local public spaces that are meaningful to the individual (e.g., a grandfather's photos of his grandchildren in a public space) as well as useful to document the history and culture of the specific context in which the photos are taken. The photos are part of the photographers personal memory and DL and the contribution to a participatory DL becomes part of the history of the locality and related institutional DLs.

## ISSUES AND CHALLENGES

The development of participatory DLs raises many kinds of challenges. Technical issues include inexpensive and reliable massive storage, ubiquitous high-speed connectivity, interoperation across data platforms and formats, and long-term persistence assurances. These technical issues will be addressed naturally as cyberinfastructure evolves. More difficult challenges relate to changes in how people work, think, and collaborate. The expertise that librarians acquire as professionals is challenged by contributions by non-experts and we must find ways to leverage mass

participation while ensuring the professional organization and service models are in place to ensure effective and efficient DL operations. Open mass participation leads to diverse opinions and expectations and we must develop trust and provenance models that validate information or at least provide transparent traces of how information was created

and by whom. Economic models for challenges such as sustainability, intellectual property, and social capital in global contexts may take decades to meet.

Regardless of the challenges, participatory DLs are a positive step forward toward international cooperation on knowledge sharing, organization, and preservation for future generations.

## REFERENCES

Jones, P. 2001. Open (source)ing the doors for contributor-run digital libraries. *Communications of the ACM* 44(5) (May. 2001), 45-46.

Kirk, D. & Sellen, A. (2010). On human remains: Values and practice in the home archiving of cherished objects. *ACM Transactions of Computer-Human Interaction,* 17(3).

Marchionini, G., Augmenting Library Services: Toward the Sharium. *ISDL '99: International Symposium on Digital Libraries*, (Japan, 1999)

# Information Poverty: The Development of a Global Moral Agenda[1]

**Johannes Britz**
Interim Provost & Vice Chancellor for Academic Affairs
University of Wisconsin-Milwaukee, USA

## GENERAL INTRODUCTION

Information poverty is one of the main forms of poverty today. It relates to an individual's or communities inability, not only to access essential information but also to benefit from it in order to meet their basic needs for survival and development.

Information poverty is a rather complex notion and many factors contribute to this condition. One of the primary contributing factors is the shift from the industrial era to the information era which is characterised by a new information based economic mode. This paradigm shift is made possible by the development of modern information and communication technologies (ICT). Modern ICTs brought about profound transformation in the information and knowledge landscape. These technologies are indeed the most spectacular and revolutionary technologies ever developed when it comes to the creation, distribution, dissemination and repackaging of information, and the interactive sharing of knowledge.

This paradigm shift towards the economics of information introduced advanced capitalism as well as the process of globalisation. Through globalisation a network of economic and social networks is created and the gap between rich and poor countries is no longer a "physical object gap", but has become rather an "immaterial information gap" (Clark, 2001). Open markets and competitiveness have made it imperative to invest in innovation and knowledge production. Research and development (R & D) as well as higher education increasingly play a crucial role in knowledge production and innovation to meet these new demands (Friedman, 2005). This has led to greater investment in knowledge production.

The problem is, however, that information and knowledge societies emerged at the expense of the so-called information and knowledge poor countries. Scholars such as Chatman (1996) started in the nineties to distinguish between information rich and information poor countries. ICT statistics support their claim. For example:

- One third of the world's population is illiterate.
- More than 2 billion people live under $2 a day.
- In the USA there are more computers than in the rest of the world (combined).

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[1] This paper is based on a doctoral thesis by the author in 2007, and is published with the permission of the University of Pretoria.

- The ten richest nations in the world are responsible for 84% of total expenditures on R & D.
- 20% of the world's population is responsible for 90% of Internet usage (World Bank Report, 1999/2000 & Human Development Report, 1998/99).

What needs to be stressed here is that, although ICT played a dominant role in dividing the world between information haves and information have-nots, and the role of ICT should therefore not be underestimated, information poverty is not restricted or limited to a technology/digital divide only. The information divide is not limited to the 'technology insiders' and "technology outsiders" of cyberspace (Floridi, 2001). It is a much more complex phenomenon including issues such as cultural and language diversity, levels of education and the ability/inability to access and benefit from information as well as the ability/inability to participate in a meaningful way in the new information based economy. Furthermore, the divide between the information rich and the information poor is not only a divide between societies and countries. It occurs also between individuals who might share the same culture and physical space.

Information poverty is furthermore not only of a political, cultural and socio-economic nature. We live in a new emerging global information society where we are, more than ever before, dependent on creation of, access to, sharing and manipulation of information. This has created new power relationships and also raised questions and concerns such as the fundamental freedom of people, the right to freedom of expression and communication, the right of access to information and the fair distribution of information in the market place. This emerging global information society and the growing divide between the "information have" and "information have nots" is therefore also a serious moral concern.

Because information poverty affects the lives of billions of people on a daily basis it should be on the world's moral agenda of social responsibility. It is a moral imperative that the continuous construction of the growing information society be regulated by a set of universal principles based on social justice. This statement serves as my basic motivation for writing this article: *viz.* to formulate broad ethical principles that can be used to guide the social, economic and political initiatives to solve information poverty and to create a fair and equitable information society.

## GUIDING MORAL PRINCIPLES TO ADDRESS INFORMATION POVERTY

I propose five moral guidelines that can be used to address information poverty. A summarised version of these guidelines has been published in the Journal of Information Science (Britz, 2004), and a number of the African examples have been summarised in the article published in the International Information and Library Review (Britz, *et al.*,2006).

### *Guideline 1: Each Person in the Community has an Equal Right of Access to Essential Information Required to Develop and Exercise other Basic Rights*

This guideline is based on the core principle of the equality of all people, irrespective of who and what they are, and on the fact that people have certain basic human rights. This is also based on reciprocal justice and justice of recognition according to which no negative discrimination based on among others race, gender, religion or economic status may occur with regard to access to essential information needed to satisfy basic human needs. Reflecting Rawls's first principle, this right of freedom of access to essential information may not be affected or compromised for any greater economic gain. It is furthermore a positive right and corresponds with the duty of society, and more specifically the state, to ensure that essential information is available and accessible. This right is thus considered fundamental and inalienable.

There are a number of examples that meet the criteria of social justice as expressed in this guideline. I highlight one: The South African Constitution, which protects this fundamental information right. South Africa entrenched the right of access to information in its Constitution, and passed a law, the Promotion of Access to Information Act, Act No. 2 of 2000, that protects its citizens' right to access essential information (Promotion of Access to Information Act, 2000). In the Constitution, Chapter 2, Section 32[1] it is stated that everyone has the right of access to information held by the State, while everyone has the right of access held by any other (natural or juristic) person which is needed for the exercising or protection of any rights. Section 32[2] mandates the South African Parliament to pass legislation that will give effect to the rights in Section 32[1], and states that provision may be made for reasonable measures to assist the State in the administrative and financial burden that will be brought about by the exercising of the right of access to State-held information.

The main intention of the Act is made clear in Section 9 where it is stated that the Act must (Ackermann & Britz, 2006):

- give effect to the constitutional right of access to information;
- give effect to the reasonable limitations provided for in the Constitution;
- provide for the "vertical" and "horizontal" working of the Act by providing for access to records of public and private bodies;
- make the access to records as swiftly as possible; and
- empower everyone who wants to use the Act by enhancing knowledge about rights of access and the functions and records of public and private bodies.

It is clear, based on the working of the Act, that this right is viewed by the South African government as a positive right according to which the State has a responsibility to ensure that its citizens can exercise this right. Public and private bodies must have manuals available describing information procedures and requests and an information officer must be appointed to manage information request for citizens. If access to information is refused, a reason for doing so has to be stated and the aggrieved party may follow legal procedure if dissatisfied with the reasons. Also, the information officer has a duty to assist information requesters in the following manner:

- An illiterate or disabled requester may submit an information request orally, and it is the responsibility of the information officer to reduce it to writing (section 18[3]);
- The information officer must render reasonable assistance free of charge (Section 19[2]);
- If the request refers to a record that is in possession of another public body, the information officer has to transfer the request within 14 days to the mentioned public body (Section 20).

***Guideline 2: Access to Essential Information should also Imply the Accessibility and Benefit Thereof***

This ethical guideline is necessary since access to information does not necessarily imply the accessibility thereof. If

the Namibian government should, for example, decide that all essential government information should be made available in electronic format only, this would mean that the vast majority of citizens could not exercise their right of access to essential government information because of a lack of access to computers and/or the Internet. In this case one can argue, based on contributive and distributive justice, that the state, as an instrument of power, has a responsibility regarding the fair and equal distribution of government information to ensure that it is also accessible by other means, such as printed newspapers and the radio.

Distributive and contributive justice, therefore, implies not only the fair distribution of information, but also making it accessible and affordable. However, accessibility to and the affordability of essential information alone are not enough. Based on the view that essential information is a common good and that it is instrumental to the creation of human well-being (see Sen's capability approach), people must also be able to benefit from access to information. It can therefore be argued that, based on justice as enablement and Sen's capability approach, institutions (both government and non-government) should launch educational initiatives to enable the benefit of access to information.

The most valuable asset of an information and knowledge society is its intellectual capital and societies, to be able to become information and knowledge societies, must invest in their people. Education and investment in human capital are therefore fundamental in addressing information poverty and in the development of human capabilities. Based on Sen's capability approach it is an imperative that society should meet the conditions that will allow the development of the human intellectual ability (education) that determines their well-being and allows them to achieve their goals. Social justice, in particular as expressed in this guideline, requires the making available of resources to allow not only accessibility of essential information but also to allow the development of humans to benefit from the information and allowing participation in different socio-economic and political activities.

The affordability of information proves to be one of the major obstacles regarding access to information. Access to electronic content at first glance appears to offer an economic solution. Modern ICT can actually contribute in a positive manner to narrow the economic divide between the information rich and information poor. Publishers of electronic content are however driven to make profit and, even though reproduction cost has come down dramatically, the overall cost of digital information production has not been eliminated. Electronic publishers also guard their intellectual property vigilantly. The problem therefore remains, namely that the normal commercial cost of electronic journals, handbooks and databases are beyond the reach of many institutions in the developing world. In this context reciprocal justice demands fairness in these exchange relationships.

A further important aspect of the accessibility of information relates to the way in which the content is packaged – i.e. the medium in which the information is presented, must not be contextually unfamiliar to the receivers thereof or in a language that is totally inaccessible.

Africa is a good case in point when it comes to the justification of this guideline. Africans are to a certain degree in a privileged position when it comes to language and access to the global body of knowledge. A large number of Africans living on the continent can speak or understand either French or English, two international languages that have a prominent representation on the Internet. Furthermore, both languages are the dominant political, economic and scientific languages on the continent. The drawback is the low level of literacy (Britz, *et al.*: 2006). In the 2005 the average

illiteracy rate on the African continent was 35%. One sign of hope is the fact that the average illiteracy rate of people between 15-24 is substantially lower at 20% (African Economic Outlook, 2005:581).

Moreover, the problem is not so much the ability of Africans to understand foreign languages as the preservation and promotion of their own indigenous languages. There are more than 1000 languages spoken on the African continent, many of which do not have a written form. Also, very little scholarly and other scientific work gets published in local African languages (Britz, *et al.*: 2006). This excludes the majority of the world's population from a valuable source of indigenous knowledge and therefore reaffirms the importance of this guideline.

***Guideline 3: The Creation of a Minimum Physical Infrastructure that will Allow "Information Deliverability" in the Dematerialised Economy***

One of my points of departures in this article, as articulated in the introduction, is the new paradigm shift towards the economics of information, which has introduced advanced capitalism and the process of globalisation . The gap between the rich and the poor countries is no longer only limited to a "physical object gap", but has become also an "immaterial asset gap", where the key immaterial assets are information or knowledge (Clark, 2003; Britz *et al.*, 2006). The immaterial asset gap has some important implications for the right of access to and accessibility of information. In the era of this new economic paradigm and of globalisation the right of access to information has become one of the most important social rights, since it is a precondition for participation in the various socio-economic and political activities of a modern society – for example online buying.

The problem is that the new information economy is underpinned by a material, efficient and in many respects a top-heavy infrastructure that includes harbours, airports, railways, roads, warehouses and physical addresses of people. A dematerialised information-based economy without a physical infrastructure to allow the delivery of the physical products is therefore of little use and can even create unmet expectations. The digital divide has indeed more than ever become a physical (infrastructure) divide and therefore necessitates this important guideline which is based on participative justice, the capability approach and contributive, distributive justice as well as justice as enablement.

From an economic and political perspective one can actually argue that a well-developed information infrastructure and a corresponding physical infrastructure form the backbone of all socio-economic and political activities of the information and knowledge society. From a moral perspective I also argue that a well-developed and well-maintained information infrastructure and corresponding physical infrastructure form the "moral backbone" to our human freedom (Lor & Britz, 2006). Based on this guideline I therefore argue that both governments and the private sector have a moral obligation to develop and maintain affordable infrastructures facilitating access to the physical products and serves that are made accessible through modern ICT. A well developed information infrastructure, supported by an efficient physical infrastructure, can assist people to create a national economic identity, will allow access to basic services (e.g. health care and education), and will contribute to allow nations to sell their products and services globally (African Economic Outlook, 2005:47).

***Guideline 4: The Adoption of the Right to Communicate to Enable Meaningful Participation and Global Dialogue in the Information and Knowledge Society***

The creation, processing, fair distribution and use of information and knowledge are not the only moral concerns. Based on justice as recognition it can be stated that communities must also have the right to communicate, to share their views and to learn from others. Contributive as well as distribute justice also demands the establishment of a global communication platform to address social justice which can include issues such as information poverty and environmental issues.

Hamelink (2003:3) correctly points out that we should move beyond "information and knowledge societies" towards "communication societies". The right to communicate is essential in the globalised society in which we are living because "globalisation without dialogue becomes homogenisation and hegemony. Localisation without dialogue becomes fragmentation and isolation" (Hamelink, 2003:3). Modern information technologies, in particular the Internet, have for the first time made such a global interactive dialogue possible and allowed more and effective inter- and cross- culture communication opportunities. The new communication media also gave new meaning to the right to communicate by allowing groups to organize, mobiles and publicise much more effectively than in the past. The new ICT platform opened a global discourse on matters such as global poverty, global warming and respect for human life. In this regards Calabrese (2005) argues that this new global movement for communication rights is an expression of the global justice movement, representing mostly civic society.

The right to communicate featured prominently at the first WSIS meeting (2003) and scholars such as Kuhler (2003) and Hamelink (2003) strongly argued, in line with the WSIS agenda, that the right to communicate be adopted as an additional universal right that must form part of the Universal Declaration of Human Rights (UDHR). In the Draft Declaration of Principles of the WSIS (Geneva 2003) it is also stated that the "right to communicate and the right for citizens to access information are fundamental to the Information Society" (WSIS, 2003). The idea is that such a right must guarantee participation in the global information-based society.

The right to communicate is also closely related to the debate about who owns and controls the media markets and the Internet (Britz, 2004). Based on this guideline it is argued that governments have an obligation to create a media environment that is independent and of a diverse nature, guaranteeing the right of the public to receive information from a variety of sources and, in the word of Habermas (1989) to maintain an open public sphere.

According to Calabrese (2005) the arena for the debate on communication rights should move away from "...a preoccupation with rights [including intellectual property rights – JJB] and entitlements, and more towards norms of social responsibility" (2005:303). I agree. Communication rights should not only focus on issues relating to the commodification of media and control of governments and corporations in terms of the development and application of stricter intellectual property right regimes or censorship. The right to communicate is also about the fundamental right to communication social justice issues.

There are a number of examples that meet the criteria set by this guideline. I briefly discuss Africa as an example. There are some exiting developments in South Africa that partly meet the criteria set in this guideline. A second fixed line telecom operator has been introduced in August 2006 which will hopefully bring the necessary competition to lower fixed line communication costs in South Africa. VOIP was also deregulated in 2005, opening up the possibility for cheaper calls and cheaper broadband access to the Internet. Vodacom and MTN, two mobile operators in South Africa,

have also introduced a "third generation" mobile technology that can deliver broadband access to laptops. Some municipalities, for example Knysna, started to roll out wireless services in place of the very expensive fixed line services provided by Telkom, which is one of the two official national telecom operators. It is predicted by BMI-T, a market-research firm, that there will be more that 400 000 broadband connections in South Africa by the end of 2006 (Economist, September, 2006:56). These new developments will certainly allow more South Africans to communicate and be part of a global dialogue. The concern however remains: will it be affordable? According to Storm, a telecom firm operating in South Africa, some telecommunication costs in South Africa is still on average 30 times more expensive that in the liberalised markets – in particular the USA and EU (Economist, September 2006:56).

***Guideline 5: Ensure the Fair Protection and Promotion of Indigenous Information Property and the Transformation of Society to Enable Reconciliation***

This ethical guideline is necessary because of the numerous examples of injustice against the information poor. The treatment of indigenous people regarding the exploitation and misuse of their indigenous knowledge as well the inability of modern intellectual property regimes to recognise, protect and promote indigenous knowledge necessitate this guideline.

Transformative justice requires a new look at not only possible harm that has been inflicted on the information poor but also at the means to restructure and transform society in such a manner that these injustices do not happen again.

In recent years there has been an increasing awareness of the exploitation of indigenous knowledge by means of wrong patenting and other forms of IPR applications. This has led to the recognition of the need for more effective protection of indigenous knowledge rights in this area. A number of new developments at the international and national levels meet the criteria of justice as transformation.

Countries such as South Africa, Australia and India are revising their current IPR regimes to accommodate the protection and promotion of indigenous knowledge (Britz & Lor, 2003). India has also successfully contested the granting of non-traditional knowledge systems patents, which has led to the cancellation of the patents. Most of these were patented in the USA. However, it was an expensive and lengthy process. As a response to such wrongful patenting, India created a traditional knowledge digital library, making this knowledge public domain. This led to WIPO's special union for the International Patent Classification (IPC) to investigate how wrongful patenting can be prevented and to find ways to link or integrate traditional knowledge into the IPC (TKDL, 2001).

WIPO is also showing an increased interest in the fair protection of indigenous knowledge. Apart from fact-finding missions and organising round tables on indigenous traditional knowledge, an Intergovernmental Committee on Intellectual Property and Generic Resources, Traditional Knowledge and Folklore was established in 2000. The aim of this committee is specifically to investigate the international protection of indigenous knowledge (WIPO, 2003). Support for the international protection of indigenous knowledge has also come from the United Nations Conference on Trade and Development (UNCTAD) which held an Expert Meeting in October/November 2000 to discuss ways to protect indigenous knowledge and to prevent further improper appropriation of indigenous knowledge. According to UNCTAD the most promising option would be "...to bridge traditional collective rights with the more modern and western concept of intellectual property rights" (Capdevila, 2000).

## CONCLUSION

In this paper I argued that information poverty is one of the main forms of poverty today. It relates to an individual's or communities inability, not only to access essential information but also to benefit from it in order to meet their basic needs for survival and development. As such it raises some serious moral concerns. In this paper I present a set of moral guidelines that can be used to address these moral concerns.

## BIBLIOGRAPHY AND WORK CONSULTED

Ackermann, M. & Britz, J. J. 2006. *Information law and ethics*. Pretoria: Van Schaik.

*African Economic Outlook.* 2006. OECD Publication. Paris: African Development Bank.

Barka, L. B. 2004. Africa and the knowledge society. [Online]. Available from: http://www.uneca.org/eca_resources/Speeches/2004_speeches/042704speech_ms_ben_ba. Accessed 25 January 2005

Britz, J. J. 2004. To know or not to know: a moral reflection on information poverty. *Journal of Information Science*, 30(1), 192-204.

Britz, J.J. 2007. Critical analysis of information poverty from a social justice perspective. D Phil, University of Pretoria, Pretoria.

Britz J. J. & Lor, P. J. 2003. A moral reflection on the flow from south to north with specific reference to the African continent. *Libri*, 53(3): 160-173.

Britz, J. J., Lor, P. J., Coetzee, E. M. I. & Bester, B. C. 2006. Africa as a knowledge society: a reality check. *International Information and Library Review*, 38: 25-40

Calabrese, C. 2005. Communication, global justice and the moral economy. *Global Media and Communication*, 1(3): 301-315

Capdevila, G. 2000. Indigenous peoples defend traditional knowledge. *InterPress Third World News Agency* (IPS). 8 November 2000. [Online]. Available from: http://forests.org/archive/general/indefkno.htm. Accessed 6 January 2004.

Chatman, E. A. 1996. The impoverished life: world of outsiders. *Journal of American Society for Information Science*, 47(3): 193-206.

*Commission for African Report.* 2005. [Online]. Available from: http://www.commissionforafrica.org/english/report/introduction.html. Accessed 19 October 2005

Clark, D. A. 2006. The capability approach: its development, critiques and recent advances. *Global Poverty Research Group* W-P-S-032. [Online]. Available from: http://www.gprg.org/. Accessed 3 May 2006.

Clarke, M. 2001. e-Development?: development and the new economy. *UNU world institute for development economics research,* policy brief no. 7. Helsinki: United Nations University.

Economist. 2006. Better late than never: telecoms in South Africa. *The Economist*, September 2006: 56-57

Evans, P. B. & Wurster, T. S. 1997. Strategies and the new economics of information. *Harvard Business Review*, (September): 71-82.

Floridi, L. 2001. Information ethics: an environmental approach to the digital divide. *Philosophy in the Contemporary World*, 9(1): 1-4.

Floridi, L. 2001. Information ethics: an environmental approach to the digital divide. *Philosophy in the Contemporary World*, 9(1): 1-4.

Habermas, J. 1987. *The theory of communicative action.* Cambridge: Polity Press.

Hamelink, C. J. 2003. Moral challenges in the information society. *Media Development,* XLX(4): 40-43

Kuhler, R. 2003. Why communication rights so controversial? In: *Visions in process: world summit on the information society Geneva 2003 - Tunis 2005*, edited by Heinrich Böll Foundation. Berlin: Heinrich Böll Foundation: 54-57.

Sen, A. 1993. Capability and well-being. In: *The quality of life*, edited by M. Nussbaum and A. Sen. Oxford: Clarendon Press

Traditional Knowledge Digital Library (TKDL). 2001. *CSIR News*, 51 (5&6): 1-3. [Online]. Available from: http://itt.nissat.tripod.com/itt0103/tkdl.htm. Accessed 12 December 2004.

*UN's Economic Commission.* 2000. [Online]. Available from: http://www.sp.uconn.edu/~ wwwanc/history.html. Accessed 3 December 2005.

*UNESCO Universal Declaration on Cultural Diversity.* 2002. [Online]. Available from: http://unesdoc.unesco.org/images/0012/001271/12760m.pdf#search=%22UNESCO%20Universal%20Declaration%20on%20Diversity%22. Accessed June 14 2004.

World Bank. 1998/99. *World development report: knowledge for development.* New York: Oxford University Press. [Online]. Available from: http://worldbank.org/wdr/wdr98/views.htm. Accessed 9 July 2005

# Towards an Asian Vision of Library and Information Research

**Christopher Khoo Soo Guan**
Programme Director, MSc (Information Studies) and Associate Professor
Division of Information Studies, School of Communication & Information
Nanyang Technological University, Singapore

**ABSTRACT**

The LIS profession and LIS researchers in Asia have been looking to the West for leadership, ideas and technology. Is it possible to develop an Asian vision and perspective of LIS? What is needed for an Asian brand of LIS to develop? The paper discusses these issues as well as report an analysis of LIS journal articles written by Asian authors, to identify areas of strength in Asian LIS research. It was found that Asian LIS authors publish mainly in the areas of bibliometrics, information retrieval, automatic text analysis, information and Web technologies, scholarly publications, education and knowledge management.

## INTRODUCTION

The LIS profession and LIS researchers in Asia have been looking to the West, particularly the U.S. and Britain, for leadership, ideas and technology. Aside from the many librarians and information professionals who obtained their professional education in the West, a substantial proportion of the current faculty of LIS schools have obtained their PhD from schools in the U.S. and the U.K. LIS schools in Asia are maturing, and the quantity and quality of research have been rising, with increasing numbers of research publications in top journals and conferences. Mukherjee (2010) found a two-fold increase in the number of articles by Asian authors in LIS journals indexed in Social Science Citation Index in the period 2001 to 2007. However, LIS researchers in Asia continue to look to the West for research ideas and research collaborations. Mukherjee analyzed the co-authorship patterns and found that most collaborations occurred among authors in the same country or with authors in non-Asian countries! There are few collaborations across countries in Asia. In another study of authorship patterns in the top 20 LIS journals indexed in the Web of Science in the period 1967-2005, Park (2008) found that authors in the Asia and Pacific region were more likely to collaborate with authors in the U.S. than with authors in another country in the Asia and Pacific region. 15.7% of the articles by an author in the Asia/Pacific region had a co-author in the U.S., and another 13.1% had collaborators from countries outside the region.

Is it possible for an Asian vision or brand of LIS and LIS research to emerge? Will the body of LIS research in Asia eventually develop its own "Asian" characteristics and perspectives?

Or has the LIS field become so globalized and internationalized that it is no longer possible for a subculture or sub-community of scholars to emerge?

It is certainly desirable to develop information services and technologies that serve our communities better, that

address our national problems, and that are more suited to our cultural, historical, socio-economic and political environments. In attempting to do this, a national or Asian brand of LIS may emerge, that draws on Asian conceptions, symbols, thought patterns and frameworks. In any case, it is desirable for more dialog and collaboration among Asian scholars, which can give rise to new ideas, solutions and paradigms with an Asian flavor.

How can LIS schools encourage this development? What are the prerequisites for this development? I think the prerequisites for developing an Asian brand of LIS research are:

1. A critical mass of well-trained and talented LIS researchers
2. A conducive academic environment for them to do their best work
3. Resources to support research and good students to work with
4. Collaboration with libraries and industry to ground their research in the local contexts.

These prerequisites are, to a large extent, satisfied. Asian LIS schools have an increasing proportion of faculty with PhDs. Some schools are sponsoring faculty members to go overseas to obtain their PhD. Many universities have become research-intensive universities where faculty are expected to focus on research. Because of the growing economic prosperity in Asia, there is increasing government and commercial funding for R&D. There is also growing appreciation for lifelong learning among the people, and people are increasingly enrolling in higher degree programs thus boosting the graduate student population.

These conditions are necessary but not sufficient for evolving an Asian LIS. A conscious effort needs to be made to promote interaction, dialog and collaboration among LIS researchers in Asia. To develop an Asian brand of LIS, there is a need to build

- Communities of researchers in different sub-areas of LIS
- Who carry out high quality, rigorous research
- Working on common problems
- Building on each other's work/ideas, and citing each other's work
- Developing areas of excellence and strengths in particular aspects of LIS
- Addressing problems in the context of Asian culture, language, and socio-political-economic environments, and
- Drawing inspiration from their culture and society.

In recent years, several initiatives have been started to promote dialog and collaboration among LIS researchers and educators in Asia, including:

- The Consortium of iSchools Asia-Pacific (CiSAP, http://www.cisap.asia/)

- The Asia-Pacific Conference on Library & Information Education & Practice (A-LIEP)—the fourth conference will be held in Malaysia June 2011 (http://fim.uitm.edu.my/a-liep2011/)
- The International Conference on Asia Digital Libraries (ICADL)
- Taiwan-Singapore-Thailand Workshop on Library & Information Research—the third workshop will be held in Singapore in Jan. 2011 (http://www.ideapolis.sg/index.php/3rd-tst-cfp).

Research and writing can have different intended audience and scope of relevance. Some research studies are of local relevance—the research findings are of local or national relevance. An example is a descriptive study that documents and describes a service or system, or a local practice. The report, if it describes local innovations and developments, can contribute to an Asian perspective in LIS. Action research, where research and practice are intertwined, can highlight local cultural, linguistic and socio-economic contexts. However, this research approach does not seem to be much practiced in the LIS field.

Other research studies are of international relevance in the sense that the research is not contextualized or based on the local situation, and can be carried out anywhere. Extreme examples are research in mathematics and computer science (e.g. developing algorithms) that are abstract and theoretical. In the LIS field, much of the research is related indirectly or directly to the generalized user. The research is carried out in specific geographic locations, but with the intention of generalizing the results to all or most human populations and geographic locations. I propose a third kind of research—internationalized local research. This kind of research explicitly takes into consideration the local context, culture and practices, and then seeks to derive principles for applying the results to other contexts and locations.

The rest of the paper presents the results of the first part of a study to identify some characteristics of Asian LIS research, and the areas of strength in LIS research in different Asian countries. Sub-areas of LIS that have sizable numbers of publications by Asian authors should be good candidates for developing an Asian perspective. The analysis distinguishes between articles published in local journals, possibly reporting research that are of local relevance, and articles published in foreign journals that may report research of international relevance.

**Table 1. Number of journal papers indexed in the LISA database for publication year 2005-2009**

| Country | No. |
|---|---|
| Japan | 671 |
| China* | 531 |
| India | 450 |
| Taiwan+ | 428 |
| S. Korea | 170 |
| Singapore | 152 |
| Hong Kong | 136 |
| Iran | 126 |
| Turkey | 101 |
| Israel | 100 |
| Malaysia | 74 |
| Pakistan | 52 |
| Russia | 42 |
| Thailand | 23 |
| Kuwait | 18 |
| Saudi Arabia | 14 |

*** People's Republic of China, including Hong Kong ("China, Mainland" in LISA)**
**+Republic of China**

**Table 2. No. of journal papers published in *local* versus *foreign* journals for 2005-2009**

| | In local journals | In foreign journals | Total |
|---|---|---|---|
| Japan | 518 | 153 | 671 |
| China* | 191 | 340 | 531 |
| India | 129 | 321 | 450 |
| Taiwan+ | 97 | 331 | 428 |
| Korea | 0 | 170 | 170 |
| Singapore | 0 | 152 | 152 |

## DATA COLLECTION

The Library and Information Science Abstracts (LISA) database was used to retrieve bibliographic records of journal articles by authors from different Asian countries. The AF (author affiliation) field was searched with the name of

the country. For Taiwan, the terms "Taiwan" and "Taipei" were used. For China, "China AND Mainland" was used. Articles published in the five year period 2005-2009 were retrieved, and a simple crosstabulation was performed to obtain the frequencies of each descriptor term in the Descriptor field and each classification code in the Classification field.

Mukherjee (2010) had identified the 15 Asian countries with the biggest LIS publication output. Table 1 lists the number of articles found in the LISA database for these countries. The top six countries with more than 150 journal articles in the five-year period are selected for more detailed content analysis of the Descriptor and Classification fields. It was noticed that some countries had a disproportionate number of articles published in local journals and in the local language, and this might give misleading results. For example, for Japan, out of the 671 articles, 518 were published in Japanese journals mostly in the Japanese language.

So, the journal article records retrieved were divided into those published in local journals and foreign journals, and the two sets of records were analyzed separately. The *Country of Publication* field was used to identify the publication country of the journal. Unfortunately, the *Country of Publication* field is not filled for some records. For countries which are non-English speaking, the language of the article provides another way to identify articles published in local journals. It was verified that for Taiwan authors, all the Chinese language articles were published in Taiwan journals. It was assumed that Japanese articles were published in Japanese journals, and Chinese articles by China authors were published in mainland China. As India and Singapore are English-speaking countries, the language field could not be used to identify local articles. Hence, the grouping of articles ito local and foreign journals should be less accurate for these countries. The number of articles published in local versus foreign journals for the six most prolific countries are given in Table 2.

## FINDINGS

The most frequent descriptors and categories (classification code and class) for Taiwan are listed in Tables 3 and 4. The data for the other five countries are given in Tables 5 to 14 in the Appendix. The tables list the top 20 descriptors and categories, that have a frequency of at least 5. In the LISA database, each bibliographic record is assigned one or more descriptors, but exactly one category (classification code).

Table 3 lists the most frequent descriptor terms for Taiwan, divided into local (i.e. Taiwanese journals) and foreign journals. The most common descriptor term is *Taiwan*, indicating that the articles described the situation in Taiwan. It accounted for 36% of local articles, compared to 17% of articles published in foreign journals. This pattern holds for the other countries:

Japan: 48% for local journals, 33% for foreign journals (i.e. 48% of articles in local journals have "Japan" as one of the descriptor terms)

- China: 27% for local journals, 26% for foreign journals
- India: 50% for local journals, 44% for foreign journals
- Korea: 29% for foreign journals

- Singapore: 18% for foreign journals.

**Table 3. Taiwan: Most frequent descriptors assigned to journal articles**

| Keyword | Freq | % | Keyword | Freq | % |
|---|---|---|---|---|---|
| In local journals (N=97) | | | In foreign journals (N=331) | | |
| Taiwan | 35 | 36% | Taiwan | 55 | 17% |
| University libraries | 9 | 9% | Knowledge management | 38 | 11% |
| *Digital libraries* | 7 | 7% | *Networks* | 30 | 9% |
| Electronic media | 7 | 7% | Distance learning | 26 | 8% |
| Research | 7 | 7% | World Wide Web | 25 | 8% |
| Computer assisted instruction | 6 | 6% | Computer assisted instruction | 23 | 7% |
| Information literacy | 6 | 6% | *Data mining* | 23 | 7% |
| Academic libraries | 5 | 5% | Electronic commerce | 20 | 6% |
| Assessment | 5 | 5% | *Online information retrieval* | 20 | 6% |
| Citation analysis | 5 | 5% | Evaluation | 19 | 6% |
| Digital archives | 5 | 5% | *Mobile communications* | 19 | 6% |
| | | | *Wireless communications* | 18 | 5% |
| | | | Internet | 14 | 4% |
| | | | *Computer applications* | 13 | 4% |
| | | | Scholarly publications | 13 | 4% |
| | | | Bibliometrics | 12 | 4% |
| | | | Information seeking behaviour | 12 | 4% |
| | | | Information technology | 12 | 4% |
| | | | Educational technology | 11 | 3% |
| | | | Web sites | 11 | 3% |

**Note: Italics indicate IT-oriented descriptors.**

It can be seen that the list of descriptor terms from local journals is quite different from the descriptor terms from foreign journals. The most frequent descriptor terms for local journals, aside from *Taiwan*, are *university/academic libraries*, digital libraries and *electronic media*. Clearly, local journals covered in LISA are library science oriented, whereas foreign journals include IT-oriented journals. This holds also for the other five countries. One can learn much about academic libraries, digital libraries and electronic media in Asian countries from the local journals of the country.

On the other hand, descriptor terms from foreign journals are more IT-oriented. In Table 3, IT-oriented descriptors are italicized. IT-oriented articles refer to technical papers that give details of the technology or describe system development. It includes the descriptor terms *networks*, *digital libraries*, *online information retrieval* and *mobile communications*. Surveys, user studies and applications of technology are excluded and not considered IT-oriented. It is not easy to tell just from the descriptor term whether it refers to IT-oriented papers. IT-oriented descriptors are identified by scanning sample titles that the descriptor has been assigned to. A descriptor is considered IT-oriented if a majority of the articles are technical.

In the foreign journals list in Table 3, the descriptor terms with high frequencies are *knowledge management* and a number of IT-oriented terms, such as *networks*, *data mining* and *online information retrieval.*

**Table 4. Taiwan: Most frequent categories of journal articles**

| Category | Freq | % |
|---|---|---|
| In local journals (N=97) | | |
| 17.11 EDUCATION | 10 | 10% |
| 4.16 USER TRAINING | 8 | 8% |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 8 | 8% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 7 | 7% |
| 3.2 ARCHIVES | 6 | 6% |
| In foreign journals (N=331) | | |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 71 | 21% |
| 17.11 EDUCATION | 43 | 13% |
| 13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING | 34 | 10% |
| *14.19 COMPUTER APPLICATIONS* | 31 | 9% |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 30 | 9% |
| 10.1 INFORMATION WORK | 20 | 6% |
| *13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION* | 9 | 3% |
| 10.11 INFORMATION COMMUNICATION - SOCIAL SCIENCES, BUSINESS INFORMATION | 7 | 2% |
| 10.0 INFORMATION COMMUNICATION | 7 | 2% |
| *14.14 COMMUNICATIONS AND INFORMATION TECHNOLOGY - SOFTWARE* | 7 | 2% |
| 17.0 KNOWLEDGE AND LEARNING | 5 | 2% |

Table 4 lists the most frequent categories (classification code) for local and foreign journals. Class codes beginning with 13.xx and 14.xx are considered IT-oriented categories and indicated in italics. The data suggest that local journals carry articles on:

- education,
- user training and
- bibliometrics.

The top categories associated with foreign journals are:

- networks
- education
- information retrieval
- IT-oriented categories.

The high percentage for *networks* is because it is assigned to technical papers on computer networking by authors from computer science and electronic engineering departments. Other than *networking*, foreign journals carry articles on *education* and *information retrieval*. Clearly Taiwan has particular strength in the areas of education, knowledge management, networks, information technology, digital libraries and information retrieval.

Examining the lists of frequent descriptors and categories for the other five countries in the Appendix, it is observed that Asia has particular strength in the following areas:

- Bibliometrics
- Information retrieval and automatic text analysis
- Information technology and Web technologies.

Generally, about 8% to 11% of articles from each country are on bibliometrics. China and India have a particularly high proportion of articles on the subject (16% of local and foreign articles). On the other hand, Singapore has shown little interest in bibliometrics!

In addition, China and India have particular strength in the area of *scholarly publications*. Taiwan in *education*, and Taiwan and Singapore in *knowledge management*.

## CONCLUSION AND FUTURE WORK

The small analysis that I have carried out suggest the following areas of strength for Asian LIS research: bibliometrics, information retrieval, automatic text analysis, information and Web technologies, scholarly publications, education and knowledge management. However, this result is based on the descriptor terms and classification used in the LISA database. I plan to apply text mining and automatic text analysis methods to the abstracts of the articles to identify common concepts and common techniques used by the authors.

A substantial proportion of the articles published in foreign journals (17% to 44%) have the country name as a descriptor, indicating that the article describes the local context with perhaps international relevance or interest. Content analysis of the articles will be carried out to investigate whether there are Asian elements in the content of the articles.

Since non-library science researchers (e.g. from computer science, information systems, and management departments) also contribute papers to LIS journals, the data might not accurately reflect what is happening in LIS schools. Some method needs to be used to limit the data to LIS authors.

Finally, bibliometric and citation analysis techniques will be applied to find out to what extent Asian authors are

cited in each area, and to what extent Asian authors are cited by other Asian authors.

## REFERENCES

Mukherjee, B. (2010). Assessing Asian scholarly research in library and information science: A quantitative view as reflected in Web of Knowledge. *Journal of Academic Librarianship, 36*(1), 90-101.

Park, T.K. (2008). Asian and Pacific region authorship characteristics in leading library and information science journals. *Serials Review, 34*(4), 243-251.

# APPENDIX

## DATA FOR JAPAN

**Table 5. Japan: Most frequent descriptors assigned to journal articles**

| Keyword | Freq | % | Keyword | Freq | % |
|---|---|---|---|---|---|
| In local journals (N=518) | | | In foreign journals (N=153) | | |
| Japan | 248 | 48% | Japan | 50 | 33% |
| University libraries | 61 | 12% | *Online information retrieval* | 23 | 15% |
| Medical libraries | 30 | 6% | Searching | 16 | 10% |
| *Online information retrieval* | 30 | 6% | World Wide Web | 15 | 10% |
| Electronic periodicals | 28 | 5% | Bibliometrics | 12 | 8% |
| Public libraries | 28 | 5% | Internet | 10 | 7% |
| Searching | 26 | 5% | *Networks* | 10 | 7% |
| User services | 20 | 4% | Patents | 10 | 7% |
| Libraries | 17 | 3% | Copyright | 9 | 6% |
| Medicine | 16 | 3% | Scholarly publications | 9 | 6% |
| Online databases | 16 | 3% | Distance learning | 8 | 5% |
| Scholarly publications | 16 | 3% | Electronic periodicals | 8 | 5% |
| Library management | 15 | 3% | Knowledge management | 8 | 5% |
| Cooperation | 14 | 3% | Articles | 7 | 5% |
| Digital archives | 14 | 3% | Citation analysis | 7 | 5% |
| Electronic publishing | 14 | 3% | Electronic media | 7 | 5% |
| Medical school libraries | 14 | 3% | Evaluation | 7 | 5% |
| USA | 14 | 3% | Periodicals | 7 | 5% |
| Bibliographic databases | 13 | 3% | Science and technology | 7 | 5% |
| Open access | 13 | 3% | Computer assisted instruction | 6 | 4% |
| | | | Research | 6 | 4% |
| | | | Software | 6 | 4% |

Observations:

- Local journals: mainly *library science*
- Foreign journals: *information retrieval* and Web-oriented topics. Fewer IT-oriented topics than expected.
- Bibliometrics: 8% of articles in foreign journals

**Table 6. Japan: Most frequent categories in journal papers**

| Category | Freq | % |
|---|---|---|
| In local journals (N=518) | | |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 39 | 8% |
| 4.15 USER SERVICES | 17 | 3% |
| 10.15 REFERENCE WORK | 15 | 3% |
| 5.18 ELECTRONIC MEDIA | 14 | 3% |
| 16.18 ELECTRONIC PUBLISHING | 13 | 3% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 13 | 3% |
| 3.2 ARCHIVES | 12 | 2% |
| 4.16 USER TRAINING | 12 | 2% |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 15 | 3% |
| 13.17 NON BIBLIOGRAPHIC DATABASES, DATA BANKS | 11 | 2% |
| 2.12 LIS - EDUCATION AND TRAINING | 11 | 2% |
| 6.11 LIBRARY MANAGEMENT (OTHER THAN PERSONNEL MANAGEMENT) | 11 | 2% |
| 6.1 COOPERATION | 10 | 2% |
| 10.01 ELECTRONIC PUBLICATION | 8 | 2% |
| 12.11 CATALOGUING AND INDEXING | 8 | 2% |
| 13.23 ONLINE DATABASES | 8 | 2% |
| 14.19 COMPUTER APPLICATIONS | 8 | 2% |
| 16.1 COPYRIGHT | 8 | 2% |
| 4.13 USERS - SOCIAL GROUPS | 8 | 2% |
| 2.14 TYPES OF STAFF | 8 | 2% |
| In foreign journals (N=153) | | |
| 13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING | 19 | 12% |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 17 | 11% |
| 14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS | 16 | 10% |
| 17.11 EDUCATION | 12 | 8% |
| 16.1 COPYRIGHT | 10 | 7% |
| 13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION | 10 | 7% |
| 14.19 COMPUTER APPLICATIONS | 5 | 3% |

Observations:

- High frequency of articles in *information retrieval* in both local and foreign journals
- *Bibliometrics*: 11% of foreign articles

# DATA FOR CHINA

**Table 7. China: Most frequent descriptors in journal papers**

| Keyword | Freq | % | Keyword | Freq | % |
|---|---|---|---|---|---|
| In local journals (N=191) | | | In foreign journals (N=340) | | |
| China | 51 | 27% | China | 89 | 26% |
| *Online information retrieval* | 16 | 8% | *Online information retrieval* | 30 | 9% |
| Bibliometrics | 15 | 8% | Scholarly publications | 29 | 9% |
| Searching | 13 | 7% | Bibliometrics | 27 | 8% |
| Medicine | 12 | 6% | *Data mining* | 26 | 8% |
| Scholarly publications | 12 | 6% | Searching | 24 | 7% |
| World Wide Web | 12 | 6% | World Wide Web | 21 | 6% |
| Libraries | 11 | 6% | *Networks* | 19 | 6% |
| *Automatic text analysis* | 10 | 5% | Citation analysis | 18 | 5% |
| Citation analysis | 10 | 5% | Distance learning | 17 | 5% |
| *Ontologies* | 10 | 5% | *Computer applications* | 15 | 4% |
| Academic libraries | 9 | 5% | Scholarly publishing | 15 | 4% |
| Chinese materials | 9 | 5% | Evaluation | 13 | 4% |
| Competitive intelligence | 9 | 5% | Periodicals | 13 | 4% |
| *Digital libraries* | 9 | 5% | Scientometrics | 13 | 4% |
| Information services | 9 | 5% | Web sites | 13 | 4% |
| Science and technology | 9 | 5% | *Automatic classification* | 11 | 3% |
| Information science | 8 | 4% | *Algorithms* | 10 | 3% |
| Medical libraries | 8 | 4% | *Search engines* | 10 | 3% |
| Research | 8 | 4% | *Semantic web* | 10 | 3% |
| User services | 8 | 4% | University libraries | 10 | 3% |

Observations:

- Similar to Japan, China has high frequency in *information retrieval*
- Also strong in IT-oriented topics and Web technologies.
- Also strong in the subject of *scholarly publications*, ranked no. 3 in the foreign journals list.
- *Bibliometrics*: 8% of local and foreign articles

**Table 8. China: Most frequent categories in journal papers**

| Category | Freq | % |
|---|---|---|
| In local journals (N=191) | | |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 26 | 14% |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 19 | 10% |
| *13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION* | 11 | 6% |
| 10.14 INFORMATION SERVICES | 7 | 4% |
| 4.15 USER SERVICES | 6 | 3% |
| 10.1 INFORMATION WORK | 6 | 3% |
| *14.19 COMPUTER APPLICATIONS* | 6 | 3% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 6 | 3% |
| 10.11 INFORMATION COMMUNICATION - SOCIAL SCIENCES, BUSINESS INFORMATION | 5 | 3% |
| 4.16 USER TRAINING | 5 | 3% |
| In foreign journals (N=340) | | |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 60 | 18% |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 38 | 11% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 35 | 10% |
| *14.19 COMPUTER APPLICATIONS* | 30 | 9% |
| *13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION* | 23 | 7% |
| 17.11 EDUCATION | 18 | 5% |
| 13.14 SEARCHING | 12 | 4% |
| 10.0 INFORMATION COMMUNICATION | 6 | 2% |
| 10.1 INFORMATION WORK | 6 | 2% |
| 16.16 PUBLISHING | 6 | 2% |
| *14.12 COMPUTER SCIENCE* | 5 | 1% |

Observations:

- *Bibliometrics*: 14% of local articles, 18% of foreign articles
- Strong in information retrieval and automatic text analysis

# DATA FOR INDIA

**Table 9. India: Most frequent descriptors in journal papers**

| Keyword | Freq | % | Keyword | Freq | % |
|---|---|---|---|---|---|
| In local journals (N=129) | | | In foreign journals (N=321) | | |
| India | 65 | 50% | India | 140 | 44% |
| Scholarly publications | 14 | 11% | Information technology | 37 | 12% |
| University libraries | 13 | 10% | Bibliometrics | 25 | 8% |
| Electronic periodicals | 11 | 9% | Scientometrics | 21 | 7% |
| Information technology | 11 | 9% | Electronic media | 19 | 6% |
| Bibliometrics | 10 | 8% | Articles | 17 | 5% |
| Electronic media | 10 | 8% | Internet | 17 | 5% |
| Libraries | 8 | 6% | Periodicals | 17 | 5% |
| *Online information retrieval* | 8 | 6% | World Wide Web | 17 | 5% |
| Distance learning | 7 | 5% | *Digital libraries* | 14 | 4% |
| Citation analysis | 6 | 5% | *Online information retrieval* | 14 | 4% |
| Information seeking behaviour | 6 | 5% | Citation analysis | 13 | 4% |
| *Digital libraries* | 5 | 4% | Knowledge management | 13 | 4% |
| Information management | 5 | 4% | Academic libraries | 12 | 4% |
| Library consortia | 5 | 4% | Scholarly publishing | 12 | 4% |
| Physics | 5 | 4% | University libraries | 12 | 4% |
| Rural areas | 5 | 4% | Communications technology | 11 | 3% |
| Theses | 5 | 4% | Open access | 11 | 3% |
| Universities | 5 | 4% | Scholarly publications | 11 | 3% |
| | | | Electronic periodicals | 10 | 3% |
| | | | Library management | 10 | 3% |
| | | | Users | 10 | 3% |

Observations:

- *Bibliometrics* and *scientometrics* together account for 49 (11%) of local and foreign articles.
- *Scholarly publications* rank high on the local journals list.
- *Information technology* ranks high on the foreign journals list.

**Table 10. India: Most frequent categories in journal papers**

| Category | Freq | % |
|---|---|---|
| In local journals (N=129) | | |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 23 | 18% |
| 5.18 ELECTRONIC MEDIA | 9 | 7% |
| 10.14 INFORMATION SERVICES | 7 | 5% |
| 10.1 INFORMATION WORK | 6 | 5% |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 6 | 5% |
| 17.11 EDUCATION | 5 | 4% |
| 4.14 USERS - OCCUPATIONAL GROUPS | 5 | 4% |
| In foreign journals (N=321) | | |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 51 | 16% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 31 | 10% |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 16 | 5% |
| *14.19 COMPUTER APPLICATIONS* | 12 | 4% |
| 5.18 ELECTRONIC MEDIA | 12 | 4% |
| *14.0 COMMUNICATIONS AND INFORMATION TECHNOLOGY* | 10 | 3% |
| 10.01 ELECTRONIC PUBLICATION | 8 | 2% |
| 17.11 EDUCATION | 8 | 2% |
| 10.1 INFORMATION WORK | 8 | 2% |
| *13.11 INFORMATION STORAGE AND RETRIEVAL - NETWORKS* | 7 | 2% |
| *14.18 TELECOMMUNICATIONS AND BROADCASTING TECHNOLOGY* | 6 | 2% |
| 4.15 USER SERVICES | 6 | 2% |
| 3.13 ACADEMIC LIBRARIES (NOT SCHOOL LIBRARIES) | 5 | 2% |
| 10.11 SOCIAL SCIENCES, BUSINESS INFORMATION | 5 | 2% |
| 6.14 OTHER MANAGEMENT PROCEDURES AND OPERATIONS | 5 | 2% |

Observations:

- *Bibliometrics*: 18% for local journals, 16% for foreign journals
- IT-oriented topics dominate the foreign journals list

# DATA FOR SOUTH KOREA

**Table 11. Korea: Most frequent descriptors in journal papers**

| Keyword | Freq | % |
|---|---|---|
| In foreign journals (N=170) | | |
| Korea | 49 | 29% |
| *Networks* | 17 | 10% |
| *Mobile communications* | 13 | 8% |
| *Online information retrieval* | 13 | 8% |
| Information technology | 12 | 7% |
| Searching | 11 | 6% |
| *Wireless communications* | 11 | 6% |
| Internet | 10 | 6% |
| Patents | 9 | 5% |
| Scientometrics | 9 | 5% |
| Bibliometrics | 8 | 5% |
| Scholarly publications | 8 | 5% |
| World Wide Web | 8 | 5% |
| Classification | 7 | 4% |
| Evaluation | 7 | 4% |
| *Data mining* | 6 | 4% |
| Information communication | 6 | 4% |
| Knowledge management | 6 | 4% |
| *Text categorization* | 6 | 4% |
| *Computer applications* | 5 | 3% |
| Electronic commerce | 5 | 3% |
| *Mathematical models* | 5 | 3% |
| Query formulation | 5 | 3% |
| Routing | 5 | 3% |

Observations:

- Korea is clearly strong in IT-oriented topics
- Bibliometrics and scientometrics: 9%

**Table 12. Korea: Most frequent categories in journal papers**

| Category | Freq | % |
|---|---|---|
| In foreign journals (N=170) | | |
| 5.24 BIBLIOMETRICS, SCIENTOMETRICS, INFORMETRICS | 20 | 12% |
| *13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING* | 18 | 11% |
| *14.11 COMMUNICATIONS AND INFORMATION TECHNOLOGY - NETWORKS* | 27 | 16% |
| *14.19 COMPUTER APPLICATIONS* | 14 | 8% |
| *13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION* | 10 | 6% |
| *14.0 COMMUNICATIONS AND INFORMATION TECHNOLOGY* | 11 | 6% |
| 17.11 EDUCATION | 5 | 3% |

Observations:

- Bibliometrics: 12%
- Clearly strong in IT-oriented topics

# DATA FOR SINGAPORE

**Table 13. Singapore: Most frequent descriptors in journal papers**

| Keyword | Freq | % |
|---|---|---|
| In foreign journals (N=152) | | |
| Singapore | 27 | 18% |
| *Networks* | 20 | 13% |
| *Online information retrieval* | 14 | 9% |
| Knowledge management | 13 | 9% |
| Searching | 12 | 8% |
| Information communication | 9 | 6% |
| World Wide Web | 9 | 6% |
| Evaluation | 8 | 5% |
| Information technology | 8 | 5% |
| Computer assisted instruction | 7 | 5% |
| *Routing* | 7 | 5% |
| *Computer security* | 6 | 4% |
| Education | 6 | 4% |
| Information seeking behaviour | 6 | 4% |
| *Mobile communications* | 6 | 4% |
| Performance measures | 6 | 4% |
| Public libraries | 6 | 4% |
| *Wireless communications* | 6 | 4% |
| Communications technology | 5 | 3% |
| E-government | 5 | 3% |

Observations:

- A strength in information retrieval, IT-oriented topics and knowledge management.
- *Bibliometrics* and *scientometrics*: 2% (not in the table)

**Table 14. Singapore: Most frequent categories in journal papers**

| Category | Freq | % |
|---|---|---|
| In foreign journals (N=152) | | |
| 14.11 NETWORKS | 37 | 24% |
| 13.14 INFORMATION STORAGE AND RETRIEVAL - SEARCHING | 13 | 9% |
| 10.1 INFORMATION WORK | 10 | 7% |
| 14.19 COMPUTER APPLICATIONS | 8 | 5% |
| 13.13 AUTOMATIC TEXT ANALYSIS, AUTOMATIC INDEXING, MACHINE TRANSLATION | 7 | 5% |
| 17.11 EDUCATION | 6 | 4% |

Observations:

- Strength in information retrieval and knowledge management (information work)
- Bibliometrics: 3%

# The Audacious Vision of Information Schools

**Harry Bruce**
Dean and Professor
The Information School
University of Washington, USA

## INTRODUCTION

In February 2011, The University of Washington Information School will be hosting the 6th annual iConference. The first iConference was held in 2005 at Pennsylvania State University. Subsequent iConferences have been held at the University of Michigan (2006); at the University of California, Los Angeles (2008); at the University of North Carolina, Chapel Hill (2009); and at the University of Illinois at Urbana-Champaign (2010). Past iConferences have had approximately 300 faculty, students, and information professionals in attendance and have been successful in building a sense of community around the information field, bringing together people who might not otherwise engage with one another and helping people share and exchange their views associated with interdisciplinary research. The iConference in Seattle is likely to be the largest gathering of iSchool researchers ever. It has been designed to attract scholars, teachers and professionals from around the world. As we finalize the program for this conference, I am drawn to reflect on how far the iSchool movement has progresed since the first iConference held at Pennsylvania State University (PSU) in 2005.

Early in 2006, I was asked by the editor of the ASIS&T Bulletin to prepare a short article reporting on the iConference at PSU. My co-authors were Debra Richardson, Dean of the iSchool (the School of Information and Computer Sciences) at the University of California Irvine; and Mike Eisenberg, Dean Emeritus and Professor at the University of Washington Information School. We described the purpose of this first gathering of iSchool faculty and students as an open discourse whereby all participants might engage in identifying the baseline attributes and qualities that define their affiliation as "information schools." The focus was to be on essentials—on trying to articulate the essence of an "information school" and the "information field."

This goal was ambitious. For more than forty years, the information field has attempted to articulate clear statements of identity, core values, and distinctive qualities. We have learned that such a discourse risks the exclusion of voices, the alienation of important partners, and the creation of barriers that can threaten future collaboration. If our formula for identifying what is essential to being an information school is too narrow, we risk drawing artificial boundaries that may have long-lasting impact. Alternatively, too broad a definition runs the risk of becoming too abstract and mostly meaningless, thus trivializing the Information School movement (or iSchool movement). It is important to strike the right balance; to address the most serious and important questions.

Not surprisingly, this first collective engagement with the question of iSchool identity did not succeed in forging clear, agreed-upon, and enduring statements describing the value and purpose of Information Schools. In the years since, the iSchool movement (later known as the iSchool Project and then the iSchool Caucus) has made several attempts

at strategic communications and marketing. Much of this effort has been channeled through the iSchools.org website and through the annual iConference. The clarity of messaging an iSchool value proposition has also become a factor of the success of individual iSchools. The 28 iSchools that are currently members of the iSchool movement are top-ranked schools internationally. They collectively and individually set an aspirational standard against which other schools offering information education and research might measure their performance. The work of member iSchools therefore provides an ambitious goal for schools that seek an affiliation with this movement. The work of communication is therefore paramount. The iSchool Caucus (or iCaucus) has employed a half-time communications coordinator to assist with this effort.

It is true to say that the iSchool movement over recent years has continued to gain momentum and to add new members. The movement is now global, including schools from thirteen of the United States as well as Canada, China, Denmark, Germany, Great Britain, Ireland and Singapore. Schools across the world that focus upon information education and research are now seeking an affiliation with the iSchool movement as a statement about their own identity and the quality and impact of their work. The Consortium of iSchools of the Asia Pacific (CiSAP) is an example. This effort to promote the establishment of iSchools in the Asia-Pacific Region and to foster collaboration and exchange of new ideas is, in my view, an indicator of the success of the iSchool movement overall.

While the iSchool movement can certainly claim success in terms of momentum, broader acceptance, and deeper understanding among key constituencies and stakeholders, a number of fundamental questions remain. Perhaps the answers to these questions will always be contested and controversial. Nonetheless, it is in my opinion important to continue our attempts to be clearer with our response to four questions that are fundamental for Information Schools: (1) what are Information Schools, (2) what is the information field, (3) what is information, and (4) how does the field study information? Let me begin with a brief disclaimer. The answers presented briefly and incompletely in this paper are my answers to these key questions. They might be used to explain, somewhat, my approach to building and leading the University of Washington Information School. These views should not be regarded as representative of the iCaucus; they are presented here merely to provoke further discussion by symposium participants.

## WHAT ARE INFORMATION SCHOOLS?

Information Schools are intellectual communities made up of researchers and scholars from diverse academic and practice-based contexts, who apply different methods and theories to understand a wide range of Information issues. iSchools are interdisciplinary; including the fields of information science, library science, computer science, engineering, education, history, philosophy, sociology, management and others. Broadly, iSchools focus on the relationships among information, technology, and people. They share an interest and commitment to ensuring that people can find and effectively use the information they need to complete tasks, make decisions, and advance their personal and professional goals. This is characterized by a commitment to learning and understanding the role that information plays in human activities. Information Schools believe that expertise in all forms of information is required for advances in science, business, education, and culture. This expertise must include understanding the uses and users of information as well as the various contexts in which information is exchanged, including those facilitated by technology. The iSchools do not regard themselves as the only home for this sort of research. Rather, their aim is to create a welcoming venue for embracing the opportunities and challenges of interdisciplinary research in the information field.

## WHAT IS THE INFORMATION FIELD?

The information field draws on an interdisciplinary community of scholars, researchers, educators and practitioners to study information, information provision and information use. The goal of the field is to enhance the use of information by people in individual, social and organizational contexts.

The primary object of study for the field is information—but what is information? Attempts to answer this question have been debated so thoroughly in the literature that some critics have claimed that the field cannot define or even agree on a definition of its primary concept. This is not the case. It is true that there are a number of views on the definition of information but this makes perfect sense—the concept is complex; the more we pursue it through scholarship, research and professional practice, the more thorough and far-reaching our conceptual and operational definitions are likely to become. The unraveling of the complexity of the concept through study by researchers in the information field does not mean that we cannot reach agreement on the way the term information is viewed by the field at any point in time or for a particular context. The success of the Information School movement and the presence of iSchools in colleges and universities world-wide is evidence of a broader acceptance that information can be an object of study, a focus for academic programs and professional practice. The goal of research, scholarship, creative work and professional practice in this field is to support and enhance human engagements with information and technology. When we consider those activities most closely associated with human flourishing – learning, discovery, innovation, problem solving, decision making and recreation – the value of work in the information field is clear. For humans to flourish, they depend upon, and are supported by the effective use of information. This is what practitioners and researchers in the information field do. At the University of Washington we sum this up in our mission statement with the phrase "We make information work."

## WHAT IS INFORMATION?

Information is a "thing" (content, document, form) with potential value and application that becomes apparent with its use by an individual. As an object or thing, information can be owned and shared. It can be private, public, open or secure. Information can be represented, catalogued, classified, organized, and stored. It can be enhanced by re-structuring, packaging, abstracting and indexing. Information has value. It is needed by organizations and by individuals. When it is used, information can alter an individual's knowledge structures and facilitate discovery, decision making, and the completion of tasks and projects.

## HOW DO RESEARCHERS IN THE INFORMATION FIELD STUDY INFORMATION?

Researchers in the information field study information as an object or thing. They also study information as a process—the use of this object or thing by people. They study how the use of information by people can be enhanced through professional intervention, and the design and development of services, systems and technologies. Information researchers study information behaviors, processes, technologies, systems, services and resources. They study behaviors such as information needing, seeking and use. They are interested in processes like knowledge organization, cataloging, information management, information literacy and problem solving. They assess the need for, and design, build and evaluate information systems, services, and technologies. They are interested in information issues and policies and they study information contexts such as libraries or information use in organizations and companies. The

information researcher is interested in specific components and a blending of all things that ultimately facilitate the effective connection of people with the information that they need and use in their daily professional and personal lives.

To achieve this goal, information researchers apply an amalgam of perspectives, approaches and techniques assembled from constituent subfields and disciplines[1]. Information researchers generally acknowledge the need to use a range of methods, analytical approaches, theoretical and conceptual frameworks and orientations when examining complex information problems. Information researchers may work solo, but they have a history of seeking and accepting input from other disciplines and fields of study (both formal and informal) as a key to enhancing the rigor and quality of their research, scholarship, creative work and professional action. In this way, multidisciplinary and interdisciplinary collaboration is a hallmark and a mindset of this intellectual community where individual researchers accept that their original way of thinking about information phenomena may morph, through collaboration, into something else—an intellectual artifact of the collision and synthesis of alternative viewpoints. It is within this overlap and intersection that novel approaches to the study of information are occurring. It is here that we find the source and the momentum for the iSchool movement.

## SETTING A VISION FOR ISCHOOLS

At the iCaucus meeting in in February, 2010, concerns were expressed by iCaucus members that the iSchool movement was in need of a clear statement of intent—a vision and goals—against which its priorities, future investments and the relevance of initiatives being proposed could be evaluated. This statement should articulate where iCaucus members see the iSchool movement heading in the next ten years and describe how these goals will be achieved. As the chair of the iSchools Caucus, I have, therefore, been working for the past six months on a Vision Statement for iSchools. All members of the iCaucus have been actively engaged in this process.

Our process began with a small working group comprised of myself, Liz Liddy, Dean of the iSchool at Syracuse, and Andrew Dillon, Dean of the iSchool at the University of Texas. We developed a draft statement. This included a vision statement and a set of goals which were distributed to members of the iCaucus. The first step was to reach agreement on the vision statement. Our initial draft incorporated the following key statements:

By 2020:

1. The iSchool Movement will have spread around the world.

2. There will be a high-quality, highly visible and influential iSchool on every major campus.

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[1] The study of information is complex and overarching attracting the interest of researchers with backgrounds in a range of disciplines. There have been numerous attempts to identify the disciplines that contribute to the study of information. Over the years these have been reported to include documentation, library science, computer science, linguistics, mathematics, cognitive science, psychology, communication, logic, operations research, graphic arts, (Borko, 1968), documentation of research and development, abstracting, indexing, behavioral science, micro- and macro-publishing and video and optical science (Herner, 1984), management science, information theory, electronics, economics, classification science, systems science, artificial intelligence (Saracevic, 1991), Cybernetics, general systems theory (Rayward, 1996), language, ethnography, semiotics, (Buckland, 1999), statistics, communications, law and government (Hawkins, 2001). Those who have reported the composite of disciplines that contribute to the information field claim that the field is proud of its interdisciplinarity (Beghtol, 1995; Saracevic, 1991) and that this interdisciplinary evolution is ongoing (Saracevic, 1999).

3. The identity and purpose of Information Schools will be widely understood and valued.

4. The information field will be recognized as a core academic discipline underpinning a vital profession.

5. Large and small companies will give preference to Information School graduates when recruiting future employees.

6. Funding agencies will run programs specifically designed to support the research activity and academic programs of Information Schools.

7. Policy makers will turn to Information Schools for data and advice on how to improve or develop information services for the community.

Each statement was revised through discussion with members of the Caucus. The revised statements were then reassembled into a vision statement by the iCaucus chair and the iCaucus communications coordinator. This new version was distributed to members of the iSchool movement via E-mail for further discussion and feedback. The result was the formulation of three alternative versions of the vision statement which were once again scrutinized and discussed. Finally, a vote was taken. Members were asked to indicate (1) I prefer this version (2) I can live with this version (3) I cannot live with this version. Through this process the iCaucus developed its new Vision Statement:

> *The iSchool Caucus seeks to maximize the visibility and influence of its member schools, and their interdisciplinary approaches to harnessing the power of information and technology, and maximizing the potential of humans. We envision a future in which the iSchool movement has spread around the world, and the information field is widely recognized for creating innovative systems and designing information solutions that benefit individuals, organizations, and society. iSchool graduates will fill the personnel and leadership needs of organizations of all types and sizes; and our areas of research and inquiry will attract strong support and have profound impacts on society and on the formulation of policy from local to international levels.*

We are now embarking on the next step which is to articulate iCaucus goals. A drafted set of goals has been distributed to iCaucus members for revision and for augmentation with additional goals. The first draft of the goals was as follows:

The goals of the iSchool Caucus are to:

1. Lead and promote the Information Field
   Member schools are committed to collective efforts that will shape the information field, communicate its purpose and value and enhance its visibility.

2. Create agile and more effective responses to strategic research and academic initiatives
   Member schools work together to develop research and academic partnerships

3. Provide support for, and solutions to shared challenges
   Member schools provide one another with mutual support and a collective identity; helping constituent

schools to face local challenges and to solve problems.

When this set of goals has been resolved, members will be asked to develop a set of actions that support each goal. The aim here is to make each goal concrete in its intention and outcome. For example, actions that support the draft goal 3 might include:

1. Data sharing and benchmarking,
2. Regular meetings of the iSchool Deans (face-to face at least annually, and preferably semi-annually; via telephone every two months), and
3. Shared access to the iSchool brand and use of iSchool communication tools.

The resulting set of goals and actions will provide a framework for decisions on where the iCaucus will invest its resources and move the organization towards achieving its audacious vision.

## CONCLUSION

The iSchool movement can claim many successes. I am regularly asked by leaders of schools that focus upon information education and research how they can become an iSchool. Affiliation with the iSchool movement is considered a positive affirmation of the quality and impact of the creative work, scholarship, research and academic programs of a member school. It is important that we maintain standards for member schools as we continue to encourage new members and to motivate and support those schools that aspire to membership. We do need to continually revisit the issue of identity, value and purpose. As the movement grows and becomes even more visible we will be asked by well-meaning potential stakeholders about what we do and why it is important. We should, therefore continue to refine our message about the information field and the impact of information research and educational programs. We can do this most effectively through a clearly articulated vision, supported by goals that have demonstrable actions. My aim as the iCaucus coordinator over the next two years is to establish the framework necessary for achieving an audacious vision for iSchools aspiring towards a future where:

> *the iSchool movement has spread around the world, and the information field is widely recognized for creating innovative systems and designing information solutions that benefit individuals, organizations, and society.*

## REFERENCES

Beghtol, C. (1995). Within, among, between: Three faces of interdisciplinarity. Canadian Journal of Information and Library Science (20)2, 33.

Borko, H. (1968). Information science: What is it? American Documentation, 19 (1) p.3.

Buckland, M. (1999). The landscape of information science: The American Society for Information Science at 62. Journal of the American Society for Information Science 50(11), 974.

Cronin, B. (1995). Shibboleth and substance in North American library and information science education. Libri (45)1, 56-7.

Hawkins, D. (2001). Information Science abstracts: Tracking the literature of information science. Journal of the American Society for Information Science 52(1), 50.

Herner, S. (1984). Brief history of information science. Journal of the American Society for Information Science, (35)3 p.157.

Karki, R. (1996). Searching for bridges between disciplines: An author co-citation analysis on the research into scholarly communication. Journal of Information Science, 22 (5) 323-34.

Rayward, W.B. (1996). The history and historiography of information science: Some reflections. Information Processing and Management, 32(1) 3-17.

Saracevic, T. (1992). Information Science: origin, evolution and relations in Vakkari, P. and Blaise, C. (ed.) Conceptions of library and information science: Historical, empirical, and theoretical perspectives. Taylor Graham: London.

Saracevic, T. (1992). Information Science: origin, evolution and relations in Vakkari, P. and Blaise, C. (ed.) Conceptions of library and information science: Historical, empirical, and theoretical perspectives. Taylor Graham: London.

Saracevic, T. (1999). Information science. Journal of the American Society for Information Science (50)12, 1059.

Shera, J.H. and Cleveland, D.B. (1977). History and foundations of information science. Annual Review of Information Science and Technology 12: 249-275.

Houser, L. (1988). A conceptual analysis of information science. Library and Information Science Research 10: 3-34.

Schrader, L. (1984). In search of a name: information science and its conceptual antecedents. Library and Information Science Research. Vol 6, pp 227-271.

# The Case of the Royal School of Library and Information Science: A European iSchool

**Pia Borlund**
Professor
Royal School of Library and Information Science, Denmark

**ABSTRACT**

The present paper forms the basis of the invited talk to be given by the author at the International Symposium on the Transformation and Innovation of Library and Information Science, November 16-17, 2010, Taipei, Taiwan. The paper introduces the Royal School of Library and Information Science, Denmark, as a European School of Library and Information Science and a member of iSchool Caucus. The paper outlines some of the current challenges of the Royal School of Library and Information Science and how these challenges are met, including how the membership of the iSchool movement is considered beneficial with respect to the mentioned challenges. The paper also touches upon some of the challenges, which the iSchool movement is facing – at least from the perspective of the author.

**INTRODUCTION**

The author kindly thanks the Graduate Institute of Library and Information Studies at the National Taiwan Normal University for the invitation to act as speaker as well as for the initiative to organize the International Symposium on the Transformation and Innovation of Library and Information Science. The invitation provides an occasion and opportunity for the author to introduce the Royal School of Library and Information Science, Denmark, to the Taiwanese and international audience as well as to act as a European iSchool ambassador. It is a true pleasure to accept the invitation, to meet with dear colleagues, and to visit Taipei and Taiwan known for their great beauty, friendliness and endless hospitality.

The Royal School of Library and Information Science (hereafter: the Royal School of LIS) became caucus member of the iSchool movement in April 2009, following the Berlin School of Library and Information Science at the Humboldt-Universität zu Berlin as the second European member of the iSchool movement. Recently the department of Information Studies at University of Sheffield has joined the movement, too, as the first UK iSchool. Other non-North American iSchool members are the School of Information Systems at Singapore Management University and the School of Information Management at Wuhan University, China. With the iSchool movement being a North American initiative it is of no surprise that the remaining 22 iSchool members are from North American[1]. The high number of schools; the diversity in their approach to information (from library and information science, information management, computer science, information engineering etc); the variety in their offerings of educations, and levels of educations, and how these educations are structured; the national, international plus cultural differences; and not the least how the schools

[1] For a complete list of iSchool members, please consult: http://www.ischools.org/ (visited: October 12, 2010).

themselves are organised as well as funded provide challenges for the iSchool movement. One way to overcome the challenges is to be aware of the differences and know how these materialise. Therefore the objective of the present paper is use the opportunity to introduce the Royal School of LIS and hereby give the audience a chance to get to know the royal school of LIS better.

The paper is structured as follows: section 2 presents the Royal School of LIS as a Danish mono-faculty state-funded university, how it is organised and located at two physical locations in different regional parts of Denmark, the educations offered, and the number of staff and students at the Royal School of LIS. In section 3 a number of challenges which the Royal School of LIS is currently facing are outlined, and initiatives to meet the challenges are presented. The paper closes with section 4 in which possible challenges of the iSchool movement are presented.

## AN INTRODUCTION TO THE ROYAL SCHOOL OF LIS, DENMARK

The Royal School of LIS is internationally recognised for its research. In particular former Rector Ole Harboe and the Professors Peter Ingwersen and Birger Hjørland have managed to position the Royal School of LIS as the world leading school in Library and Information Science it is perceived as today. This position made the Royal School of LIS an obvious iSchool candidate. While Professor Hjørland is still active, Professor Peter Ingwersen has recently retired, however, still associated the Royal School of LIS as Professor Emeritus.

Interestingly, the Royal School of LIS is not very recognized nationally for its high quality research neither among the librarians and the information specialists nor by the Danish universities. This is one of the problems of the Royal School of LIS. In order to be better at communicating the Royal School of LIS"s research and to strategically further develop research areas a research strategy was formulated and implemented in 2009. The research strategy runs from 2009 to 2014 and covers the following six focus areas of research: Libraries and Innovative Processes; Research Evaluation and Research Policy; Information Systems and Interaction Design; Information Literacy and Practice; Cultural Mediation, and Knowledge and Information Theory. These research areas demonstrate the width of expertise of the Royal School of LIS, and the explication of these will hopefully mark and position the research expertise of the Royal School of LIS to the national audience, not the least to potential students.

The Royal School of LIS is one school with two locations. The main school is situated in the capital Copenhagen, and from here the primary management of the Royal School of LIS takes place. A minor branch of the Royal School of LIS is located at the university campus of Aalborg.

Royal School of LIS, Copenhagen

Royal School of LIS, Aalborg

Aalborg is the fourth largest city of Denmark with a population of approximately 123,000 citizens compared to Copenhagen which is by far the largest city of Denmark with 1,181,000 citizens. The total population of Denmark is 5½ million. Compared to Taiwan with its population of 23 million, and Taipei city of 2,607,428 people and the Taipei metropolitan area with a population of 6,776,264 Denmark is, however, a small country.

As said the management of the Royal School of LIS is mainly located in Copenhagen. Figure 1 depicts a diagram of the organizational structure, which also illustrates that an Aalborg Head of Department is appointed to specifically manage the daily business of education (teaching) and research of the Aalborg branch. The majority of managers, including Rector, Professor Per Hasle are all located at the Royal School of LIS in Copenhagen.

In the matter of business the Royal School of LIS refers to the Ministry of Culture, and not to the Ministry of Science, Technology, and Innovation as the remaining universities of Denmark do. For the same reason the Royal School of LIS is not allowed to call itself „university" despite the fact that the Royal School of LIS educates to the highest level (PhD). This is a problem as you will later see.

The Royal School of LIS is funded by the Danish State – as it is the case with all universities in Denmark. The economy of the Royal School of LIS based on the enrolment of students – more students, more money! Enrolment at the Royal School of LIS (and the remaining Danish universities) is free of charge for Danish students. This means that the educations of the students are paid for by the State (i.e., Danish tax-payers), or in other words that Danish students do not pay tuition fee. This is a part of the Danish welfare system which does also include, e.g., free use of the Danish healthcare system and financial support if one looses one"s job. The students pay for the books they are to use and for their own personal PCs. They also pay for the daily living expenses (housing, food, cloths etc.), but are, however, entitled a study grant by the Danish State that covers the basic expenses. A study grant runs for five years, and basically covers the periods of bachelor"s and master"s studies. Danish PhD students receive a salary during their three years of employment as doctoral students, a position which they are to apply for – hence not available to all.

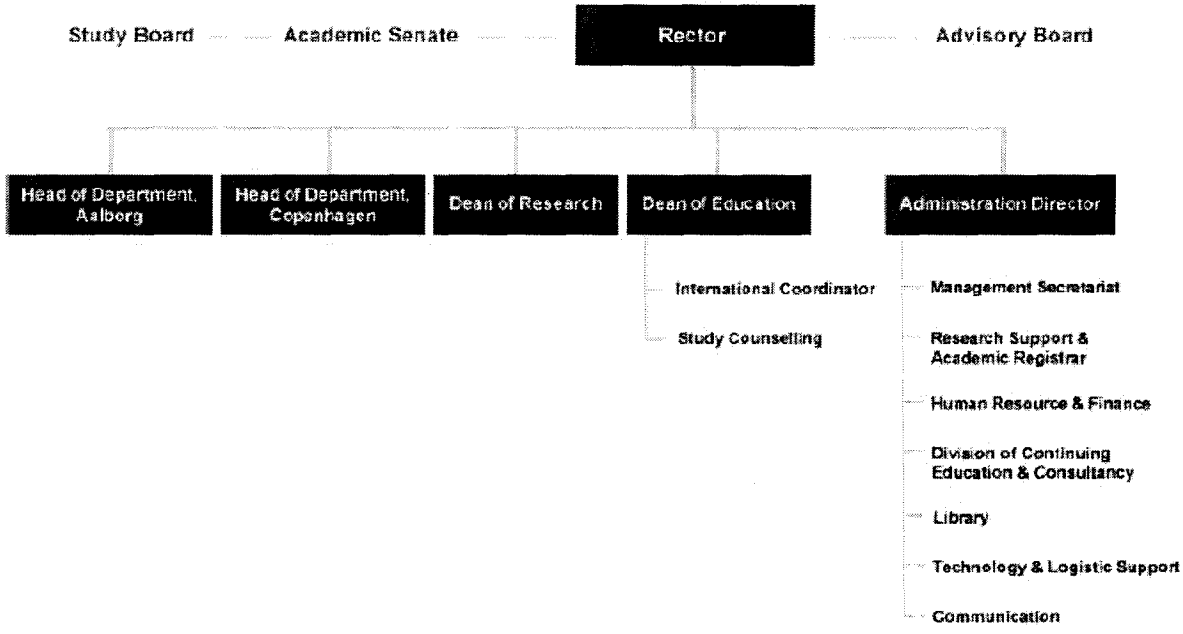


**Figure 1: Diagram of the organizational structure of the Royal School of LIS, Denmark.**

At the Royal School of LIS the following educational programmes are offered:

- Bachelor"s degree (undergraduate) in Library and Information Science – three years
- Master"s degree (graduate) in Library and Information Science – two years
- Mater"s programme is available in English, too
- PhD in Library and Information Science – three years
- National continuing education programmes in Library and Information Science (tuition fees are charged):
  - Week courses
  - One-day courses and one-day thematic workshops
  - Master-diploma courses:

    "Innovative library development" (from September 2010)

    "Information interaction and information architecture" (from September 2010)
- Education of library assistants

The bachelor"s and master"s degrees are offered with two terms per year: Autumn term (September – January) and spring term (February – June).

A total of 750 students (bachelor"s/master"s students) are enrolled at the Royal School of LIS every year. 90

students enrol, and pay, for the master diploma courses per year, and approximately 1,000 librarians and information specialists participate at the tuitions fee-based continuing education courses per year. The students (bachelor"s/master"s students) who graduate from the Royal School of LIS find jobs in the following sectors:

- 38% public libraries
- 24% industry, e.g., famarceutical companies as Novo Nordisk
- 12% public service
- 9% research libraries
- 17% academia (PhD students) (plus section of employment unknown)

It might also be worth mentioning that the unemployment rate of librarians and information specialists in Denmark is low with 2.6% being without a job (estimation from medio 2009).

Over the past three-four years the Royal School of LIS has exercised severe budget reductions, which have lead to the dismissal of many colleagues, as recently as February this year (2010). At the moment the numbers of staff at the Royal School of LIS are:

- 45 academics and researchers (including doctoral students /excluding external lecturers), and
- 33 in administration (secretaries, librarians, systems supporters, and technicians).

The distribution of staff between Copenhagen and Aalborg is depicted in Table 1.

**Table 1: Distribution of the number of staff with reference to Copenhagen and Aalborg as of July 2010.**

| | Copenhagen | Aalborg |
|---|---|---|
| Academics and researchers | 35 | 10 |
| Administration | 29 | 4 |

Approximately 35 members of staff have left the Royal School of LIS since 2006 due to either budget cuts, natural retirements or when moving on to new jobs elsewhere. The reason for budget cuts is mainly due to decreasing number of student enrolments. The low number of students is only one of several challenges of the Royal School of LIS, which is further discussed in the section below.

## THE CHALLENGES OF THE ROYAL SCHOOL OF LIS

A number of challenges of the Royal School of LIS have already been mentioned, e.g., low number of student enrolments; financial problems and budget cuts; the fact the Royal School of LIS is not very well known in Denmark; and is not allowed by law to name itself „university". The first three of these „issues" are all closely interrelated, because the very tight financial situation is mainly due to the low number of student enrolments as more students release more

money, and fewer students mean less money. There seems to be at least two, perhaps three, reasons for the low number of student enrolments: first, the potential students (and their parents) do not know of the Royal School of LIS, which is a prerequisite for enrolment. Second, the students (and their parents) seem to prefer university to „Biblioteksskole", which is the Royal School of LIS"s name in Danish (actually the name is „Danmarks Biblioteksskole" – Denmark"s Library School). In summary, knowledge of the existence of the Royal School of LIS to the public of Denmark is vital, including an understanding of the types and levels of educations provided and the areas of research expertise of the scholars of the Royal School of LIS.

One could claim that the first step in the approach of creating public awareness of the existence of the Royal School of LIS, nationally, was taken when the Royal School of LIS became caucus member of the iSchool movement in April 2009. This event was used nationally to brand the Royal School of LIS as an internationally highly esteemed LIS institution. Almost a year later (May 2010) even more progressive branding of the Royal School of LIS took place with the change of the School"s Danish name from „Danmarks Biblioteksskole" to "det Informationsvidenskabelig Akademi" (the Academy of Information Science) – hereby signalling university level without using the word „university". Rector Per Hasle explains: "The new Danish name unifies the entire institution and indicates a clear direction for the future. In the long term, it also opens up the possibility for introducing additional lines of study and combined study programmes. At the same time, the name gives a clear signal that our institution is involved in university level education, while reflecting the width of the labour market in which our candidates find employment today."[2] The Royal School of LIS"s new name is the result of a decision making process which involved the management, student representatives as well as employees at the School. In order to gain a greater insight into how the surrounding world perceives the Royal School of LIS telephone interviews with selected key persons were conducted. The focal point of the internal deliberations has been the Royal School of LIS"s unifying brand essence, which can be summarized in the statement: *We create connections*. The Royal School of LIS"s study programmes contribute to the societal development, educating – through research based teaching – information specialists with competencies in the areas of knowledge and culture. Information specialists are capable of creating connections between information and knowledge, knowledge and users, and not least between users.

A new logo followed the new name, and new material for recruitment of potential students was made. Efforts of improving student study facilities, especially at the Royal School of LIS in Copenhagen, have also been made in order to make the Royal School of LIS a more attractive place to study. This have resulted in inviting and functional reading and work places, and „comfort zones" which all are much appreciated by the students (for an illustration of the new facilities please see the photos by Jacob Boserup).

[2] Source of the quotation by Rector Per Hasle: http://www.iva.dk/english/aboutus/default.asp?cid=25744 (visited: October 12, 2010).

**© Jacob Boserup: Student reading in the comfort zone.**

Further branding initiatives have be taken with reference to what the Royal School LIS is and what it stands for by sharpening of the research and education profiles partly via the previously mentioned research strategy and by redesigning the educations with a clearer focus on skills leaned rather than where to work with these obtained skills – (this includes minimizing the use of the word „library" in the descriptions of the educations offered at the Royal School of LIS).

Many of these initiatives have, in addition to provide awareness of the existence of the Royal School of LIS, also made the School an attractive partner for research and education – no doubt the iSchool movement membership also plays and important role in this interest towards the Royal School of LIS. A visible sign of this interest are the agreements of cooperation made with the neighbouring universities of Copenhagen and Aalborg, respectively (2009). The agreements have already resulting in new courses offered and students from primarily Copenhagen University attending these courses at the Royal School of LIS in Copenhagen.

Of all of the challenges of the Royal School of LIS the low number of student enrolments is the most serious, and therefore it is so much more satisfactory to notice that this year"s enrolment of bachelor students has increased with 37% – it is an indication of that all the initiatives and efforts makes a difference for the good.

**© Jacob Boserup: Students doing group work.**

Another good thing that is happening to the Royal School of LIS is the close cooperation with the Berlin iSchool, which is a direct result of joining the iSchool movement. Doctoral students from the two schools present research projects to each other via video conferencing – as such this is an example of what the Royal School of LIS hoped to gain from joining the iSchool movement. That is, being part of a network from which students and scholars can benefit in the exchange of ideas for research as well as curriculum development, and by being part of a network hereby expanding the network of the Royal School of LIS and of the individual academics and researchers of the School.

© Jacob Boserup: Student working in the study room.

## THE CHALLENGES OF THE ISCHOOL MOVEMENT

The iSchool movement was founded in 2005 by a collective of U.S Information Schools with the purpose of advancing the information field in the 21st Century. As then, so it is today, that each individual iSchool has its own strengths and specializations, but together they share a fundamental interest in the relationships between *information,*

*people,* and *technology*[3] . Under this theme the iSchools have united and the movement has developed. The large number of iSchool members is a strong indication of how the movement has succeeded in promoting the movement and in advancing the information field. Now it is time to define the future purpose of the iSchool movement as the global movement it has turned into. A potential challenge in this respect is to define a clear purpose and support it to become reality.

As said previously the existing iSchool members differ from each other in so many ways that this in itself represents a challenge. That be in how they are economically funded, organised, or with respect to cultural and educational differences. In order for the iSchool members to work together they are to know each other and understand the premise, the differences and the similarities of the schools. It remains an issue how they are to get to know each other better, world wide? Is this process of getting to know each other better to be initiated and supported top-down via the iSchool movement, or to take place as a bottom-up initiative carried out by the individual members on ad hoc basis?

Another remaining challenge or issue to deal with is how to gain the most of the iConference and make it an attractive and stimulating event to participate in. The iConference is an excellent opportunity and forum for the members (and non-member[4] ) to get together and meet. However, with the iSchool movement having turned into a global movement this also means that participating in the iConference is no longer a „local" event. Hence participation becomes a matter of travelling costs and travelling time, two things which we all are short of. This means it has to be worth the while, not the least considering how the iConference has to compete with the „traditional" conferences within the information field.

The iSchool movement is strong movement which has proven its worth by going global – the challenge ahead is to maintain its strength and relevance to the community of the information field by being an assert for, and of importance to this community.

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[3] http://www.ischools.org/site/about/

(visited: October 12, 2010). 10

[4]The call for participation at the iConference 2011 to be held in Seattle, WA, February 8-11, 2011 can be found here: http://www.ischools.org/iConference11/2011index/. Please note, the conference is open to all and participation is hence not restricted to iSchool members, only.

# Digital Library Research and Information Schools – a Personal View of i-Schools Movement since Mid 90's

**Shigeo Sugimoto**
Graduate School of Library, Information and Media Studies
Research Center for Knowledge Communities
University of Tsukuba

**ABSTRACT**

The author considers that the mission of information schools is research and education relevant to connecting people and information, to providing appropriate information to people who have information demands. The 'Information School', a new category of schools in higher education, was born in the Library and Information Science community when they faced the transition to the new networked information environment caused by the explosion of the WWW and the drastic changes of the environment that continues even today. LIS schools had to change their role in accordance with the change of social demands for human resources and for new knowledge and technologies due to the fundamental change of the information environment.

The author got his degrees in computer science in late 1970s and early 1980s. In 1983, he joined the University of Library and Information Science (ULIS), which was a higher education institution dedicated to library and information science founded in 1979 by the Ministry of Education and merged with the University of Tsukuba in 2002. He had opportunities in the middle to late 1990s to visit several library and information science schools as well as opportunities to participate in digital library research activities such as DLI meetings and international DL conferences. In these experiences, he saw the change of the environment for library and information science schools and a movement towards information schools.

This paper covers a personal view of digital libraries and information schools based on the author's experiences. It describes the library and information school at Tsukuba followed by a brief description of Japanese LIS education. And then, it describes digital libraries and information schools from the author's point of view.

**KEYWORDS**

transition of information environment; library and information education; digital libraries; Consortium of information Schools Asia-Pacific

## INTRODUCTION

The explosive growth of the Internet and World Wide Web in 1990s fundamentally changed the global information environment. The change continued after the turn of the century with the rapid growth of new businesses and public services on the Internet, development of advanced mobile phones and services via mobile phone networks, new trends of digital resource intensive services such as digital libraries, digital archives, e-government, e-science and so forth. Library

and information science schools were significantly affected by these changes, as were computer science and information technology schools. Several LIS schools have changed their names to 'Information School' since the mid-1990s.

The author has been working at a library and information science school in Japan since 1983. He has been actively working on digital library and metadata research since the mid-1990s. This paper contains personal views of the author on information schools based on his experiences in his activities.

There was a big gap between communities of library and information science, memory organizations, computer science and information technology before the WWW. The LIS community is oriented to management of information resources and services at libraries and memory organizations where huge amounts of resources are stored. The CS/IT community is oriented to technologies to handle information resources in digital forms. The WWW bridged the communities by making a huge amount of digital resources available on the Internet and thus created a frontier.

Digital Library Initiatives (DLI, phase 1) hosted by NSF, NASA, and DARPA, started in 1994, played a very important role in bridging different communities, i.e., library and information science, computer science, and memory organizations such as libraries, archives and museums. The participation of the Library of Congress, the National Library of Medicine and the National Endowment of Humanities in the phase 2 of DLI showed that the importance of the digital library had been broadly recognized.

Thus, the changes and cross-domain activities in 1990s created a continent which was new to existing communities. The new continent, filled with unorganized information resources, required new technologies and knowledge for people to make use of the resources. A digital library was obviously an important service there. Movement toward I-Schools from L-Schools was a natural trend that happened under these circumstances. Physical entities such as library buildings had less importance than before and network-oriented services to provide appropriate information to users had more importance.

This paper, written from the author's personal perspective, it is not organized as a scientific paper to analyze information schools or their movements. Section 2 describes the author's context to show the bias of this paper, the library and information science school where the author is affiliated and LIS education in Japan. Section 3 describes digital library research activities from a retrospective point of view. Section 4 describes information schools from the author's point of view and the Consortium of information Schools in Asia-Pacific (CiSAP).

## BACKGROUNDS

### Personal Backgrounds

The author got his bachelor, master and PhD degrees from the Department of Information Science, Faculty of Engineering, Kyoto University in 1977, 1979 and 1985, respectively. The Department of Information Science, Kyoto University, is one of the first computer science and engineering departments established in 1970. His research topics at that time were software engineering and programming languages.

He joined the University of Library and Information Science (ULIS) in 1983 and since then he has been working at the same place despite the organizational changes. He has been involved in research activities in major international

digital library conferences since the late 1990s, i.e., JCDL, ECDL and ICADL. He has been involved in the Dublin Core Metadata Initiative since late 1990s.

**Library and Information Science at Tsukuba**

The University of Library and Information Science (ULIS) [1] was founded in 1979 in Tsukuba by the Ministry of Education of the Japanese government as a higher education institution dedicated to library and information science. The origin of ULIS is a training school of librarianship founded by the Ministry of Education in 1921. In 1964, a junior college dedicated to library science was founded by the Ministry of Education in Tokyo and it was re-structured and extended as ULIS.

The curriculum of ULIS included subjects in information technologies and computer science as well as those in traditional library and information science at that time. A significant topic in the IT area in the first decade was the Integrated Library Information System. ULIS was an early adopter of a local area network on its campus. In the 1990s, Internet and the WWW brought new concepts in LIS to ULIS, e.g. digital libraries, portals, institutional repositories, and so forth. For example, ULIS hosted a series of International Symposia on Digital Libraries.

ULIS had undergraduate and graduate programs. ULIS was merged with University of Tsukuba in 2002. The graduate and undergraduate programs became the Graduate School of Library, Information and Media Studies (GSLIMS) and the School of Library and Information Science (SLIS), respectively. SLIS was merged with the College of Information Science, which is a undergraduate program in computer science, in 2007. The new school is called the School of Informatics and has three colleges – College of Information Science (COINS), College of Media Arts, Science and Technology (MAST), and College of Knowledge and Library Science (KLIS).

KLIS is the direct successor of SLIS in terms of LIS education. MAST is a new undergraduate program oriented to digital content technologies and Internet science and jointly organized with computer science faculties. COINS, which covers computer science and information technologies, is taught by computer science faculties. As of year 2010, GSLIMS has about 65 faculty members, and about 50 and 15 members of the whole faculty are engaged in KLIS and MAST, respectively.

GSLIMS has four groups of faculties - Information Media and Society, Management of Information and Media, Information Media Systems, and Information Media Development. Very roughly speaking, the first two groups are humanities and social science oriented and the other two groups are information technology oriented. Research grants show the area of active research at GSLIMS. Table 1 shows the area and number of projects funded by the Japan Society for the Promotion of Science (JSPS) from FY2007 to 2009. The table shows the top 2 areas are "Library and information science/Humanities and social informatics" and "Media informatics/Database". On the other hand, the breadth of the disciplines shows the breadth of subject areas of the faculty members, i.e. from Humanities to Material Sciences"

**Table 1. Area of Research at GSLIMS – statistics of JSPS grants (FY 2007-2009)**

| Area | Discipline | Research Field | #rewards |
|---|---|---|---|
| Comprehensive fields | Informatics | Library and Information Science/Humanities and Social Science Informatics | 18 |
| | | Media Informatics/Database | 6 |
| | | Other fields | 6 |
| | Other Disciplines | | 3 |
| New multi-disciplinary fields | Nano/micro science | Nano structural science, etc. | 3 |
| Humanities | Philosophy, Literature | Chinese Phy., Japanese Lit. | 2 |
| Social Sciences | Law | New Fields of Law | 3 |
| | Psychology, Education | Social Psychology, Education | 2 |
| Mathematical and physical sciences | Physics | Condensed matted physics I | 1 |
| Engineering | Applied physics, Electric. & electronic engineering | Communication and network engineering, etc. | 3 |

### Library and Information Science Education in Japan

There are only a few schools dedicated to Library and Information Science in Japan. School of Library and Information Science at Keio University is a well-known and strong organization in Japan. On the other hand, courses for librarianship called "Shisho" (司書) in Japanese are provided at many universities and colleges - 156 universities and 81 junior colleges in all of Japan as of FY2009. The subjects of the librarianship course are given by the Ministry of Education. Very generally speaking, the librarianship course covers basic knowledge and the skills of librarians. In the Japanese employment system at libraries, the certificate of Shisho is appreciated but not mandatory for employment as a librarian.

The Liper project, lead by the Japan Society for Library and Information Science, produced reports about renovation of Japanese LIS education [2][3]. The revised Shisho curriculum will be applied to all courses from FY 2012.

## DIGITAL LIBRARIES

### Digital Library Research – a retrospective view

In the mid-1990s, 'Digital Library' was a key word as a new direction not only for libraries but also library and information schools because, in theory, any resources in a library can be shared on the Internet if they are in digital formats. As mentioned in section 1, DLI pushed many universities to promote digital library research. Major international conferences on digital libraries were born in this period – two DL conferences which are roots of ACM-IEEE JCDL were held in 1994, ECDL in 1997 and ICADL in 1998. At the same time, there were many large-scale digitization programs at national and university libraries. Since then, the digitization efforts continued and expanded to the global community, and a huge number of digital collections of cultural heritages are available today. Collaboration across libraries, archives and museums is a crucial activity to enhance the usability of the digital resources. Another crucial activity for building digital collections in this decade is the development of institutional repositories. Collaboration among repositories has been actively pursued to enhance the usability of the repositories.

### Metadata and the Web

Information resource management and information management are core areas in library and information science. Catalogues are obviously a key component for libraries to manage their holdings. In addition to the catalogues, libraries maintain authority data of names and subject headings, which are also important to manage their resources and to help users access the resources. Catalogues, authority data, subject headings and other library data are typical metadata created and used at libraries. Metadata is crucial to search, find, select and access information resources on the Internet. Metadata is created not only for information resources but also for many other objects such as users, providers, user environments and so forth.

The library and information science community has been the core community for the research of metadata. They should continue to be a central player for metadata not only for conventional library resources but also for networked information resources used on the Internet.

Dublin Core metadata is very widely used on the Internet. Dublin Core is designed for semantic interoperability of metadata on the Web, which is unlike conventional metadata schemas because it is designed for cross-domain interoperability whereas conventional schemas are usually designed for intra-community interoperability. The author has been involved in the Dublin Core Metadata Initiative since late 1990s. DCMI is basically supported by voluntary participants. The participants are from different communities but the library (or library and information science) community is obviously the largest community. On the other hand, DCMI has been closely working with the World Wide Web consortium, especially the Semantic Web community for this decade.

The concept of Application Profiles developed by DCMI clearly split a metadata schema into metadata vocabularies and structural constraints. The former includes vocabulary of attributes (or properties, elements) and that of terms to express attribute values. This separation is the heart of Dublin Core as well as its small set of terms. And, in addition, this model is semi-formally defined, which is known as the Dublin Core Abstract Model. Thus, the Dublin Core has different flavors – library flavor as a simple bibliographic data and a formal data model flavor as a machine interpretable schema.

Controlled vocabularies and authority files are an important asset not only for libraries but also for users on the Web. The Linked Data (or Linked Open Data) activity is inter-connecting vocabularies (or ontologies) to enhance the semantic basis of the Web, i.e., Library Linked Data activities. Thus, metadata technology in the networked information environment is an integration of knowledge and experiences of the library community and information technologies for the Web developed by data engineering and knowledge technology communities..

**Networked Information Environment**

Huge amounts of digital information resources are available in the Web. Our information environment was drastically changed over the last twenty years. There was a big gap between LIS and CS/IT because of lack of shared resources in the past. Nowadays, both camps are doing research in the same field - Web and Web resources.

Figure 1 illustrates the transition of our information environment. Before the WWW, we accessed server by server via computer networks (Fig.1a). WWW virtualized connection paths to servers by linking documents (Fig.1b). Nowadays, WWW is being turned into a cloud where we can obtain information resources from somewhere in the cloud (Fig.1c).

Figure 2 illustrates the transition of our library environment. In the past, we accessed library information systems via

computer networks, i.e., online public access catalogues and online databases (Fig.2c). WWW promoted the development of digital libraries. Library services including digital libraries are accessible via WWW today (Fig.2b). However, this means that we still identify which library is being used. Each site on the Web is becoming invisible by the progress of the Web, the so-called Cloud (Fig.2c). Collaboration activities among libraries and other memory organizations will boost the evolution of access paths to information resources.

## INFORMATION SCHOOLS MOVEMENT - FROM THE COMPUTER NETWORK TO THE CLOUD

### Defining Information Schools

Table 1 shows that, on one hand, Library and Information Science and Databases are the central research topics at GSLIMS but, on the other hand, the research area is widespread. The author considers that this is a common feature among LIS schools, where the width would depend on the size of a school.

The author generally defines the mission of information schools as "research and education of issues to link people and information." People (or organizations) need appropriate information or information resources in their activities. It is crucial for people living in the networked information society to be able to find, select and use appropriate information or information resources. Information Schools do research and education to advance technologies and knowledge to provide appropriate information or information resources for people.

### CiSAP: Consortium of information Schools Asia-Pacific

Consortium of information Schools Asia-Pacific (CiSAP) [4] was established in December 2008 at the International Conference on Asia-Pacific Digital Libraries (ICADL 2008) in Bali, Indonesia. As of November 2010, CiSAP has 19 member universities from 10 countries. At ICADL 2006 in Kyoto, the author and his colleagues who had shared experiences in organizing the ICADL series agreed to form an organization to promote collaboration among their schools and departments – a consortium of Asia-Pacific information schools. Since then, we exchanged ideas to establish the consortium at face-to-face meetings and via email communication. We had a panel discussion for CiSAP at ICADL 2007 in Hanoi, Vietnam and then launched the consortium.

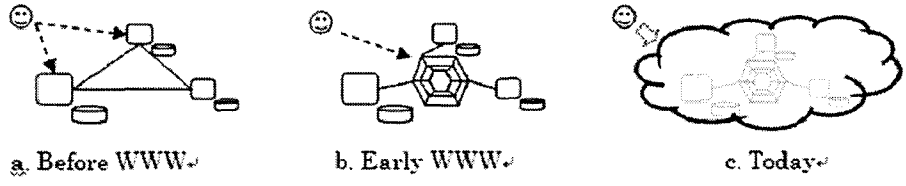


**Figure 1 Transition of Networked Information**

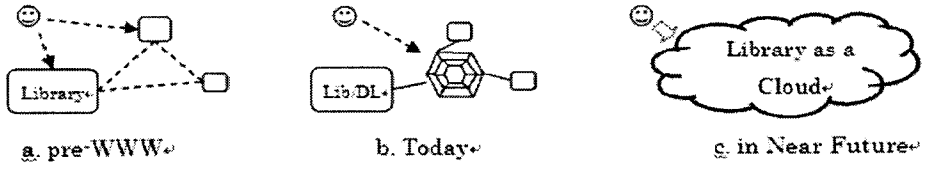


**Figure 2 Transition of Library Environment**

In our planning discussions, we agreed that we should not raise the bar to participate in CiSAP because of the diversity of development levels, economic environment, education systems, culture and language. We also agreed that "information" is the core term for CiSAP but CiSAP should be inclusive – from traditional library oriented areas to new IT oriented areas. The conditions for schools and departments to participate in CiSAP are as follows,

- Minimum of 5 faculty members or equivalent, and
- Participate in the annual CiSAP meeting at least once for three years.

At this time, CiSAP does not collect money from members. The CiSAP Web site is maintained at Nanyang Technological University. Thus, CiSAP is a voluntary organization.

Voluntary organization is advantageous to obtain members but it is a little hard to move things forward quickly. The value of CiSAP from the author's perspective is that it is useful for schools and departments in the region to use CiSAP as a platform to share information and promote exchange. Face-to-face meeting is valuable and effective to share information and know members but it is expensive. We are soliciting to use networks to share resources. It is important for CiSAP to start from what we can do today.

At previous CiSAP meetings, we agreed that we should use international conference in the Asia-Pacific regionto provide meeting opportunities. ICADL is a natural place for CiSAP because CiSAP was born from that community. A-LIEP (Asia-Pacific Conference on Library and Information Science Education and Practice) is also a natural place for us to meet.

## CONCLUDING REMARKS

When the author visited the School of Information and Library Studies at the University of Michigan in 1995, the author first heard about the new name of the school – School of Information. The name sounded very impressive because the term "Library" was excluded from the name and there was no "Science". The author had a very positive impression from the name because the name directly told that the school does research and education on "information". At that time, he interpreted the name as a strong message that the school was moving toward "information" in the networked information society from traditional library oriented education and research while keeping their important role as an ALA accredited master degree.

The progress of the networked information environment has caused fundamental changes in our information seeking and access processes. At the same time, libraries as well as other memory organizations have been fundamentally affected by the changes. Physical entities such as places and buildings have less meaning today than in the past. The physical information medium has less meaning today than in the past as well. Orientation toward "Information" from physical

entities is very natural. On the other hand, it is crucial for us to link information to people which is a physical instance.

**ACKNOWLEDGEMENTS**

The author would like to express his sincere thanks to Graduate Institute of Library and Information Studies, National Taiwan Normal University for organizing this symposium to share lessons learned from our experiences and new ideas for future.

**REFERENCES (URLS ACCESSED IN NOVEMBER 2010)**

[1] History of University of Library and Information Science – 25 years records, Graduate School of Library, Information and Media Studies, University of Tsukuba, 372p, 2005 (in Japanese)

[2] Liper Report (in Japanese), http://wwwsoc.nii.ac.jp/jslis/liper/report06/report.htm, 2006

[3] Liper 2 Report (in Japanese), 2010, ttp://panflute.p.u-tokyo.ac.jp/liper3/?action=common_download_main&upload_id=31

[4] Consortium of information Schools Asia-Pacific, http://www.cisap.asia/

# Panel I

# Insights and Expectations of Library & Information Science Research : An Academic Perspective

# Exploring Innovative E-learning Research Issues in Library and Information Science Fields

**Chih-Ming Chen**
Associated Professor
Graduate Institute of Library, Information and Archival Studies
National Chengchi University, Taiwan

Libraries have long been a primary resource used by instructors and learners to search and obtain learning resources. Although libraries are stores of valuable learning materials, their contributions to learning activities have not been acknowledged in the past. The rapid development of information and communication technology (ICT) in the e-Learning field necessitates the re-engineering of libraries to enable the delivery of library services that support efficient and effective e-Learning. The e-Learning with libraries' support should be fully discussed from three viewpoints including physical library, digital libraries/museums, and librarians. First of all, most readers served libraries as reading space, thus ignoring the principal property of libraries in supporting learning—rich book resources with excellent organization. Therefore, few evidential researches related to e-Learning supported by physical libraries were proposed. Furthermore, a digital library has powerful and efficient functionalities for content management (acquisition, storage, indexing, access, and maintenance), considerable metadata for content enrichment and structuring, as well as services for effective content searches, access, annotation, filtering, and dissemination. Due to the richness of structured digital collections, digital library services have been an essential component of a quality e-Learning system, and the growth in e-Learning, in which education is delivered and supported through computer networks, has also raised new research issues for library services. Although digital libraries have the potential to change significantly the fundamental aspects of the classroom in ways that can have an enormous impact on teaching and learning, new pedagogical methods and easy-to- followed pedagogical procedures should accompany digital libraries as an emerging technology for education to reach the goals of formal, informal or life long education. Additionally, the goal for twenty-first century school librarianship in the United States and abroad has shifted toward more active involvement of librarians in student learning through teacher and librarian collaboration. However, the nature of this collaboration, including the process of collaboration, and the extent to which teachers and librarians working together improve teaching and learning, have yet to be fully explored. Particularly, few empirical studies have specifically examined the effectiveness of teacher and librarian collaboration.

Except for exploring the importance of e-Learning research in library and information science fields from different viewpoints, this talk also presents several innovative studies in relation to effectively e-Learning supported by physical libraries, digital archives/libraries, and librarians. Meanwhile, several potential research directions of e-Learning in library & information science fields have also been addressed in this talk. The talk aims at appealing that library and information science fields pay much attention to e-Learning research as well as encouraging much more scholars, who are interested in e-Learning research, to join this research field.

# Linking Pictures: An Implementation of Idea "Linking Pages" on Pictures

**Ji-Lung Hsieh**.
Assistant Professor
Graduate Institute of Library and Information Studies
National Taiwan Normal University, Taiwan

My presentation will introduce an idea called "linking pictures" for sharing content on pictures in Web 2.0 environment. Both Tim Berners-Lee (2007) and Kevin Kelly (2007) have shared their views on the links between documents, pages, and data in Web 1.0, Web 2.0 and Web 3.0, respectively. Especially, both of them have indicated that the idea "linking pages" is a key feature of Web 2.0 services. Now, all wiki and blog services provide links from one page to another. However, pictures sharing services such as flickr or Picasa only provide the "tagging mechanism" for users to share or organize their pictures. The current tagging function shows another Web 2.0 feature—that is, users' sharing content. Compared with hierarchical categorization services such as "My Favorite" of IE or "Bookmark" of firefox, the current tagging mechanism seems to be just an implementation of alternative classical knowledge organization strategies.

Therefore, I begin to think how to implement the concept of "linking pages" on pictures. Two pioneering applications—facebook and Google map–have provided similar services. The former allows its users to label and link any part of a photo to any facebook users, while the latter allows its users to link locations to any webpage. However, the labeling function of facebook and Google Map are limited in their own environments. I notice that several services such as Tagtoo, Stipple and Pixazza have started to provide their users the function of adding links on any parts of pictures at arbitrary blogs to other pages. The function works like the "ImageMap" function of most HTML editors, but allows a blogger to add links on labeled objects in a picture. By this way, a reader can click the labeled object and link to another webpage directly, which reveal the concept of "linking pages" for pictures. It's not hard to imagine that the following scenario will happen.

"One day, when you read a friend's blog, you find that your friend's handbag in the photo draws your attention. And you cannot help clicking on the handbag. Immediately, you are directed to the Amazon page for the product, which you can click and buy at once."

The implementation of linking pictures reveals that a picture is not just a document or a single concept. The "object" or "content" on a picture can be accessed and linked to other pages. So, users don't need too much words, clicks, or searches for discovering the content of a picture. Just two clicks—one from an author for setting the links, and the other from a reader—can link the content of pictures and other pages together. This is what I called "linking pictures."

# Re-Search for Micro Phenomena with Macro Investigation

**Ming-Hsin Phoebe Chiu**
Assistant Professor
Graduate Institute of Library and Information Studies
National Taiwan Normal University, Taiwan

For years, information behavior research has received a great attention from the LIS research community, whether information seeking, information transfer, or information use. Despite the proliferation of studies in information behavior research, LIS researchers are still eagerly seeking phenomena to be investigated, deliberate the possibility to adopt perspectives from other disciplines, such as sociology, management, psychology, and computer science. All these have led LIS to the pathway of inter-discipline. However, it leaves several questions and dilemmas that every one of us has to ponder:

1. LIS needs not only user studies but also the studies that can build a strong tie between population under investigation, problems addressed, and service design.

2. LIS needs another possible horizon to explore information behavior by looking through theoretical Lenses of:

   - Affective paradigm
   - Social, cultural, and ethical paradigm
   - Organizational and political paradigm

3. Participatory librarianship needs participatory (action) research

   - As library community is moving toward the participatory nature through the practice of community engagement, Library 2.0, and open access, LIS research needs also to reflect current and emergent priorities and to respond to the changing circumstances. Participatory research, different from natural scientific approach, becomes one alternative for research community to go beyond user-centric to value-centric, context-specific to general alignment.

4. LIS needs to re-search for micro phenomena with macro investigation

   - Research topic that is micro enough to actually make the changes based on research findings
   - Research orientation that is macro enough to capture the inner, outer, and in-between phenomena with both objective and subjective perspectives.

# I Think, Therefore I Am:

# Make a Choice between to Change or not to Change

**Ming-Shu Yuan**
Associate Professor
Department of Information and Communications
Shih Hsin University, Taiwan

Adaptation and variation is an instinct for species to survive. The change of environment, culture, science, and technology modulate academics and industries to develop. To face current change, library and information science try to reconstruct, merge, and cooperate to find the new ways. It means except of the original specialized library service, it also expands its services into all in need of information services. Therefore, the role has become a combination of librarians, archivists, information architectures, digital archives as an informational service professional. Nevertheless, the development of academics and industries influence library deeply. I am submitting some comments on how to master between to change or not to change as below.

1. Library versus Library related environment

Cooperation is a solution to adapt the fast changing environment. It takes efforts to conduct studies and interactions in order to achieve mutual understanding of roles, missions, and services among above mentioned organizations. This is especially true that information services between professional mechanism and general industry.

2. Information Flow versus Value Chain

We have been viewing our professional from view points of "Information Flow" that we are familiar with which we pay more attention on individual output during the flow. However, if we view it from the supply chain or value chain of the information services, libraries or related institutes have become to provide both services and content provisions, and information consumers also have changed as well. How to satisfy these consumers has become an important research topic.

3. Publication versus Posting

In the past, libraries focused on publications as information resources which had established its own rules. However, with the development of cyberization, it is necessary to clarify that what is the scope of information resources as whether it is a product or a service. In accordance with the development of digital archives and institution repository, together with introduction of social software, different origin of sources produce different products, therefore, the problem of the scope of information resources have been high-lighted as well.

4. Professionals versus Web Users

We provide professional information services, and what we deal with are professional issues. Users' information behavior or classification behavior is one of our major research topics. What we should do is to design systems as tools to classify and organize information in order to help us to conduct information analyzing, categorizing, or constructing tools for retrieval. It is not for us to instruct web users to help us to do information organizing or management. One of the proper ways is to promote information utilization and information ethics through imparting of Information Literacy.

5. Breadth versus Depth

It is approaching systematic development through years of efforts in building foundations of skills, tools and standards, accompanied with theories of librarianship. Thus, to be more in breadth and depth are possible, however, problems may encounter in each aspect accordingly.

6. Library and Information versus Information and Communications

Library and information emphasizes on information sharing, while Information and communications emphasizes on effects. The combination of the two will certainly spark new impacts for the profession.

7. Libraries versus Library Related Industries

In addition to librarianship, our Government has set out 12 service industries. Each industry has requirements for talents in information services and information communications. It is extremely good opportunities for LIS and/or ICS Master's and Doctoral Degree Programs.

# Cooperation in the Curriculum：Catalyst the Profession to Collaboration

**Sheue-Fang Song**
Associate Professor
Department of Information and Library Science
Tamkang University, Taiwan

The LIS education is always copying with IT trend, and also be a charting the future roles played by library and information professionals. The adaptation to the digital age is stimulating curriculum innovation, to establish a new professional profile and to encourage the extended role of library and information professionals. In this relentless socio-economic and IT fly change, it is important for the diverse approaches to LIS education to have a strong community cooperation and collaboration, from courses to curriculum, from faculty to local community organization, and also extend to national and international dimension.

This present will focus on cooperation and collaboration in library and information science teaching and pedagogy, in with the goal of creating a clearer understanding of the issues impact on the professional qualifications and the motivation of students and graduates. It is not hard to understand why we should develop this capacity.

How are curricula in changing to the new educational needs? IT and new professional skill are always can keep up with world trend. But there is always on going. Only below issues can save with the goal of exchanging of ideas about the opportunities for curriculum development and for research.

**Cross-courses collaboration**: Formal curriculum review processes, professional faculty association small group team.

**Cross-institutional collaboration**: Different dimension organizations have commitment to a common collaboration mission for long term.

**Cross-international collaboration**: Maybe grater risk, power is an issue.

Among my academic colleagues at the department, there seems to be an unwritten assumption, which sometimes emerges in very explicit form, in which the Laboratory are not only the heart of the group courses, but are also somehow on a higher plane than professional fields. Teaching and research in those areas is "pure," in professions "applied," and, therefore, broad and deeper.

On the other hand, among at least some laboratory practitioners, one can find a quite pronounced view that we who are teaching in professional programs are not foggy-headed researchers-- hopefully impractical, capable of preparing our students for the real world of practice. More specifically, our curriculum is often seen to be so connected to real-world situations that it can offer more use to the working professional.

So what is it that we are doing when we get curriculum in this profession? Doing "merely" applied practitioners and curriculum collaboration view as so important that it is of useful Catalyst in the curriculum.

# iSchool: Seeking an Identity or Accelerating the Transformation?

**Shiao-Feng Su**
Association Professor
Graduate Institute of Library and Information Science
National Chung Hsing University, Taiwan

We have been often told that using a building, i.e., the library, to name our discipline is a bit awkward. Our school names evolved from library science to mostly library and information science. Some have completely eliminated the word "library," such as school of information studies or department of information and communication. The battle is not only over nomenclature but more importantly over identity and value. Would supplant the school name by or supplement it with the word "information" substantially increase our identity or change our core value?

The iSchool movement brought into focus the relationship among information, technology, and people, accenting on "understanding of the uses and users of information, as well as information technologies and their applications." In reviewing course offerings, library and information departments/institutes in Taiwan and ALA accredited ones, being members of iSchool or not, already added more and more information technology courses. The faculty ecology has also adjusted accordingly: almost every school has at least one full-time faculty member with doctoral degree from computer science or related disciplines.

While iSchool endeavors to transform the value systems, researchers are closely examining users and their use of "iLibrary." The author eagerly looks forward to the flourish of real-time digital reference services and information commons. Nonetheless, while many users benefit from the convenience and new concepts, there exist some insist on face to face contacts and some fondly remember the library as nothing but a quiet sanctum. Librarians may or may not support changes with all kinds of reasons. The outcomes of iSchool—students about to become librarians—may diffuse the ideas far and wide, which helps accelerate such a transformation.

# Whither Go the Traditional Courses

**Wen-Chin Lan**
Assistant Professor
Department of Library and Information Science
National Taiwan University, Taiwan

We live in a time of change. The information environment and users' information behaviors are changing. Undoubtedly, the information technology and web tools have changed our profession and our lives. Since the mid-1990s, a number of scholars and practitioners have urged us to take action to adapt to the change. For example, Stoffle, Renaud, and Veldof (1996) wrote an article, entitled "Choosing Our Futures," suggesting

[l]ibrarians must get away from thinking that libraries are about reference, cataloging, acquisitions, preservation, interlibrary loan, and circulating materials - or even about managing physical facilities and print collections. Simply translating current library activities and tasks into electronic or digitized information will not satisfy the needs of the library's customers, nor will it ensure its future. (p.220)

In order to meet the emerging challenges and needs, many new courses have been added to the curricula offered by library schools. As a result, some traditional courses inevitably are compelled to reduce the credit hours or stop offering due to the low enrollment numbers. This phenomenon, nonetheless, makes me worry about the future of some of the traditional courses. Below I will briefly talk about my concern.

Admittedly, libraries exist to bridge the recorded knowledge and the users with information needs as well as to facilitate communication across time and space. In order to accomplish this task, we need to know how to effectively and efficiently organize recorded information for retrieval and utilization. Therefore, in the ALA's Core Competences of Librarianship, organization of recorded knowledge and information is regarded as a basic knowledge to be possessed by all persons graduating from an ALA-accredited master's program. In other words, organization and representation of knowledge is a core skill set of our profession. However, the reality seems to move in opposite direction. Courses related to cataloging and classification or information organization are reduced. Also, for some students, they might not think that this is a core knowledge they should learn. If we truly think that the ability to organize information is a must-have-skill of our profession, is this the right way to do it? Besides, what and how should we teach?

When we look forward to the future, it does not mean that we should forget our past. Most people, if not all, would agree that we can learn from history. Not only can we learn what happened in the past, the insights into the past might also carry into the present and the future. More important, learning history helps us to build up a historical perspective for viewing our world. In line with this point of view, one might assume that learning the history of libraries and librarians is helpful for promoting an understanding and appreciation of our profession. However, if we ask library school students whether they know, more or less, the history of libraries, the history of librarianship (or information science), or the history of books, it is likely that we may get an answer – "Not Really." On one hand, we agree that learning history is important. On the other hand, we do not require our students to have a historical understanding of our profession and the

development of the carriers of knowledge and information. It is contradictory. Why?

I am also concerned about another two traditional courses: Chinese bibliography (中國目錄學) and Chinese textual bibliography (版本學). The former used to be a required course for most library schools in Taiwan but it is no longer the case. Chinese bibliography has its own tradition and characteristics. It is quite different from the bibliographic systems developed in the west. Chinese bibliography with a two-thousand-year tradition should have some merits for people to learn. Nonetheless, most young people are not interested in knowing this subject. Probably it is not necessary to be a required course. I think the issue is how to attract young people to come and learn. The second one, Chinese textual bibliography, is also a unique course in our culture. This course cannot simply be taught in class. It requires a lot of practical knowledge. However, most experts who are qualified to teach this course have retired. Finding an experienced and qualified instructor will become an issue then. Also, what would be a better or more effective way to teach this course?

My last but not least concern is the preservation and conservation of library collections. As long as a library has physical collection(s), the library is responsible to safeguard carriers of knowledge and information in all forms. When library collection contains more and more digitized materials, the digital preservation issue is getting even more critical. Providing preservation and conservation treatment to ensure that all collection materials are handled properly and are housed under appropriate environmental conditions is our inescapable responsibility. However, most of us probably do not have the needed knowledge and skills to manage it. Besides, we do not teach preservation and conservation. Especially, it is not easy to find a qualified instructor. The person who can teach the course needs to have knowledge, skills and experience in preservation and conservation. In addition, digital preservation requires another set of knowledge and skills.

## REFERENCE

Stoffle, C., Renaud, R., & Veldof, J. R. (1996). Choosing our futures. *College and Research Libraries*, *57*(3), 213-225.

# LIS Education and Academic Research

**Yuan-Ho Huang**
Associate Professor
Department of Library and Information Science
Fu Jen Catholic University, Taiwan

The LIS education needs to be reexamined from time to time in the changing environment. Before we enter into the issue of education, we need to think about the roles of information professionals. I use the pyramid to present my viewpoints. At the first level, we are recognized as the role of information broker which help users to find their needed information. At the second level, we could be the knowledge leader or knowledge facilitator to lead the strategic decision in the organization. At the top level, we might become the social entrepreneur (Allison, 2007) that creates innovative solutions to social problems and mobilizes the ideas, resources, and social plans required for sustainable social transformations (Alvord, Brown, & Letts, 2004). As for the core competences of LIS professionals, ALA (2009) proposed eight core competences of librarianship, which include foundations of the profession (e.g. value, ethics), information resources, organization of recorded knowledge and information, technological knowledge and skills, reference and user services, research, continuing education and lifelong learning, administration and management composed by multidiscipline. Based on the resourced-based theory agility which is one school of strategic management, core competences are heterogeneous, unique, and difficult to imitate. Therefore, I proposed four aspects for envisioning core competences of LIS professionals, which are knowledge work leverage, solution delivery in time, entrepreneurial alertness, and agility. Some of the concepts were inspired by Sambamurthy, Bharadwaj, & Grover (2003)'s research and I adapted the abovementioned concepts to our professions. "Knowledge work leverage" is to develop collaborative and harmonious relationships between information and the users so as to enable the sharing of knowledge. "Solution delivery in time" is the problem solving ability to respond to the users' information need immediately. "Entrepreneurial alertness" is the capability to discover its marketplace and verify opportunities. "Agility" is the ability to catch opportunities for innovation by assembling essential assets, knowledge, and relationships with speed and surprise.

Seadle & Greifeneder (2007) proposed iSchool curriculum model which core concept is HCI (Human-computer interaction); the others are about managing culture and ecologies, managing technology and collections. I proposed three key elements for LIS curriculum, which are objects, technology, and management. Users and information/knowledge are categorized as objects. Technology is about computer related issue or some other devices which facilitate the speed of information delivery. The element of management include mechanism for organizing information/knowledge, techniques for communication, coordination, and resource allocation, value, culture, and passion building, leadership, etc. The three elements need to exist in every course and reach to synergy. Synergy is the combined action of two or more elements to achieve an effect of which each is individually incapable.

As for the future LIS academic research, Seadle & Greifeneder (2007) also proposed several potential library and information science research topics, such digital libraries, long term archiving, etc. Hsien-Yee (2010) mentioned about several challenges and opportunities, which include Leverage LIS knowledge to organizing information in various

venues, developing competencies in new areas, expanding the market and the reach of LIS, etc. I proposed four changing perspectives for LIS academic research: from micro to macro or hybrid, from static to dynamic, from passive to active, from downstream to upstream. The example of "from micro to macro or hybrid" is to conduct the study of users' information need, we could explore from individual level, to the group level, or the organizational level, and even the societal level. The example of "from static to dynamic" is that collect the data from cross-sectional to longitudinal data and to further investigate the effect of path dependency. The example of "from passive to active" is that we could provide timely and useful information actively while the disaster happened to help for decision making. The example of "from downstream to upstream" is that we usually organize the information or even the knowledge; we could transit the focus to find the original data and to possess the originality. In the end, four expectations are presented for the future, which are providing more flexible and adaptable mechanism for knowledge organization, creating the user's information need, marketing LIS professions from time to time, and making LIS professionals ubiquitous.

## REFERENCES

ALA (2009). ALA's Core Competences of Librarianship, retrieved from http://www.ala.org/ala/educationcareers/careers/corecomp/corecompetences/finalcorecompstat09.pdf at Oct. 28, 2010.

Allison, M.M. (2007). Women's Health: Librarian as Social Entrepreneur. *Library Trend, 56*(2), 423-448.

Alvord, S. H., Brown, L. D., & Letts, C. W. (2004). Social entrepreneurship and societal transformation: An exploratory study. *Journal of Applied Behavioral Science, 40*, 260-282.

Hsien-Yee, Ingrid (2010) People, Information, technology: information organization research, presented at International symposium on the future of information organization research in NTU, Taipei.

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms, *MIS Quarterly, 27*(2), 237-263.

Seadle, M. & Greifeneder, E. (2007). Envisioning an iSchool Curriculum. Information Research, 12(4) paper colise02. [Available at http://InformationR.net/ir/12-4/colis/colise02]

# Panel II

# Insights and Expectations of Library & Information Science Research :

# An Industry Perspective

# On Library IT Services, an Industry Perspective

**San-Cheng Simon Chang**
Deputy General Manager
eDC (Data Center), Acer, Taiwan

How the library services may better use the IT technology advancements, and in the meantime not to challenge the well-established author rights guidelines, has always been a controversial topic. The resistance from the library community to the Google project in digitizing the major library collection is a demonstrated example.

Needless to say, the on-line availability of literature search and content itself would provide improved convenience to readers in general. If conducted properly, the on-line trend would enhance business potential for publishers. However, the existing model to provide digital content from major journal publishers poses certain usage pattern restrictions to users and creates nuisances to readers who are IT "layman." Both the library and the IT-communities need to co-work in better harmony to search for a better service model.

In the search for the "ideal" technology and business model, the eco-system of the library service may be impacted. For example, in a "pay-by-usage" model, the role of network content or service providers may become more important than now, and user culture must adapt to the notion of paid- rather than free-service. The business relationship among different parties may also change.

Stack holders of the library IT services include publishers, subscribers, readers, network or search service providers, and perhaps new players of unknown nature. It is critical that the library community avoid the scenario happened to the music industry when Internet became popular. All parties need to work seamlessly and creatively to devise a new model that can benefit all.

# Observation and Hope of Professional Development of Book Information Service

**Hsueh-Mei Chang**
General Manager
Linking Publishing Co., Ltd., Taiwan

## THE TRADITIONAL PUBLISHING INDUSTRY

In Taiwan, There is a serious problem in the traditional publishing. That is no one can really control the information of book. Most of Taiwan publishing companies are medium and small-scale company, capital amount under 5 million and manpower scale under 15 persons. They issue books through the distribution system to bookstores or wholesale market etc.

1. Distributors haven't promotion and marketing plan for publication, except the new titles or popular titles or routine book sales.
2. The more popular books, the more publishing company print and the more returning books from bookstores and shops.
3. Reader can't find or buy the long tail books in the bookstore, but in the publishing company stock.

## DIGITAL PUBLISHING TREND

Digital publishing can solve the problems for the traditional publishing companies? In the digital publishing and internet trend, the publishing companies must face a lot of new questions?

1. Digital Right Management(DRM). is a term for access control technologies that can be used by hardware manufacturers, publishers, copyright holders and individuals to limit the usage of digital content and devices. DRM technologies attempt to control use of digital media by preventing access, copying or conversion to other formats by end users, including DRM and film, DRM and television, DRM and music, DRM and computer games, DRM and e-books .
2. Appearance is changing. The original paper book change to multi-form devices, ex. cell-phone, PC, Kindle, iPad...etc. What is the standard? XML or PDF or? What can we do? How to do?
3. IT technology is hardly ability to publishing company.
4. Reader's behavior is changing, Consumer's behavior is changing, too. They buy and read ebook.
5. The telecommunication companies,the platform companies, IT software and hardware companies are competitor or cooperative partner with publishing companies? Is market share or profit share or can develop

good relationship with publishing company?.

6. It is a new marketing class.

7. We need the talent ability, who can manage and operate the e-commerce and community. That is a new market and opportunity.

8. Content is King? How can we do from a content provider transfer to a service provider.

9. Content Management System(CMS) is the collection of procedures used to manage work flow in a collaborative environment. These procedures can be manual or computer-based. The procedures are designed to do the following:(1)CMS allow for a large number of people to contribute to and share stored data.(2)CMS control access to data, based on user roles. (3)CMS aid in easy storage and retrieval of data.(4)CMS reduce repetitive duplicate input.(5)CMS improve the ease of report writing and improve communication between users.

   In a CMS, data can be defined as nearly anything: documents, movies, pictures, phone numbers, scientific data, and so forth. Version control is one of the primary advantages of a CMS. There are so many CMS all over the world but there are a few useful editions of them which can guarantee Standard Software Architectures, Maintenance and Security.

10. What is the success business model in digital publishing in Taiwan?

In digital publishing, we need an excellent team work, including the ability of writer, editor, e-commerce marketing and IT technique...etc.

**PROFESSIONAL DIALOGUE WITH PUBLISHING COMPANY**

The library plays a very important role in reading promotion and knowledge management. In the digital publishing, we still study the business model of the library and publishing company, including the scope of application, occupation mode and the price. Because electronic-books read on a personal computer or an e-book reader typically use DRM restrictions to limit copying, printing, and sharing of e-books. E-books are usually limited to a certain number of reading devices and some e-publishers prevent any copying or printing. Some commentators believe that DRM is something that makes E-book publishing complex Hope all of our intelligence and talent can research a good model that make both sides can operate. When publishing company cooperate with library In digital publication, I think there are many potential opportunity. Such as：

1. Data Mining Techniques and Applications.

2. Web-information Service and Marketing

3. Web-information Retrieval

4. Value-added and Application of Digital Contents

Library can give us the above information and analysis, the data is very good reference for publishing company.

New trend is new opportunity for us. Hope all of us will do our best in the digital revolution.

# Exploring the Internet Industry Opportunities (For Library & Information Science)

**Tricia Kang (Fang-Ching Kang)**
Product Director
Yahoo! Asia, Taiwan

As we know, the beginning of World Wide Web, Yahoo! had played an important role in Internet history. As the first online navigational guide to the Web, Yahoo! is the leading guide in terms of traffic, advertising, household and business user reach. From Library & Information Science aspect, the online directory is almost the same as the Library category. It is very clear that Library and Information Science has very close relationship with Internet.

From Internet World Stats by region report, Asia shows the highest Internet usage (ranking as No.1, 42%) around the world. From the Top 10 sites, there are 3 key search engines (Google, Yahoo!, Baidu) consume lots user's time and engagement. From both industry facts, we would say there are huge opportunities that Library & Information Science has great potential in contributing more talents and lots opportunities into Internet Industry.

Library and Information Science talents had played different key roles in the past 10 years in Internet Industry.

- 1995-2000: Librarian @ Internet, contribute to Websites surfing and Web Directory Categorization
- 2001-2005: Search Experience Enhancer, responsible for Webpage/Website ranking tuning (Blind Testing, SBS Testing) and Directory /Web search combination to create best user experience.
- 2006-2009 : Search Expert, focus on SEO / Search Quality (Segmentation, SPAM, Query Classification, Synonym) and MLR (Machine Learning) / maximize user's WOW experience

Based on the great contribution in the past years, we see more diversified opportunities in Internet, there are three major fields, including Search Centric, Product Management and Internet New Service. How to play the roles well in those fields, the talents need to have 1) Good Search Knowledge : well-understand RCFP, Spam, Query Intent and Segmentation 2) Well trained product management : not only to have the knowledge of Globalization and Internationalization, but also knows the device trend, user resign, research and good experience on project management 3)Business planning / strategy : ability to do competitive landscape, market & technology trends, customer segmentation and user needs, also identify KSF and doing related KPI setting and metrics monitoring, insight findings.

# Industry's Observations and Expectations of the Library Information Service Profession

**Fang-yin Lin**
President
Bright Ideas Design Co., Ltd., Taiwan

As we enter the digital age, libraries must evolve with the rest of society. Libraries face an increasing number of challenges, with regard to both user services and information management. New challenges come in the form of effectively utilizing new devices and new media, making them an integral part of the library experience, and even bringing about a critical moment of creative renewal for libraries.

Taiwan's first digital library is now under construction, and we can expect Taiwan's libraries of the future to rapidly transition to providing all services through information technology, establishing a new era for the library as we know it. When it comes to the digital revolution in libraries, several trends are worth noting:

1. The integration of member services over the internet. Libraries have evolved from passive managers to active providers, making available content that includes a plethora of new media services.

2. The principle of user centrality has been put into practice through the implementation of personalized services. Customized services are directed at different user segments, making the library experience a more individualized one.

3. In terms of function, library information services emphasize interactivity and participation, especially utilizing high-tech interactive techniques and facilities, a rich library reading experience, and the creation of a multi-sensual library experience in which new pleasures are explored.

4. In the temple of knowledge, a digital environment that also provides entertainment and leisure value has become a focal point of the digital library's operating plan, creating an opportunity for cooperation between libraries and creative industries in the future.

5. New learning experiences and opportunities created by digital libraries are bringing digital life into the library, and becoming a new gathering place amid urban culture.

It can be seen from the above developments that digital libraries not only establish a service system that is completely reliant on information technology, but also creates a humanities and technology space in the urban environment, providing urban residents with a new media learning experience to supplement traditional sources of knowledge.

New media-rich devices are leading the way to a lifestyle for the digital age. A convergence of information is

occurring due to cross platform and interactive tools such as cell phones and the world wide web, and library information services must also adapt to this new orientation. Therefore, from the perspective of user experience, library information service providers must think deeply about the advantage in terms of direct influence on contemporary society that images and other visual media have over printed books as a method for the spread of knowledge. How can the learning experiences provided by digital libraries succeed in inspiring readers, and how can this inspiration in turn form a kind of new redoubt for urban culture? These questions represent the new frontier for digital library information services.

# The Leading Content Solution Provider

**Yong-Ping Liu**
CEO
udn.com, Taiwan

## INTRODUCTION

1. udn.com Co., Ltd. has been twice awarded "The Digital Publishing Company of the Year"(2007, 2009) by Taiwan's Digital Publishing Awards Committee.
2. Library Service Solution：
   (1) E-book service: One-click Solution for borrowing & returning E-books online.
   (2) Platform of Chinese Media Database：udndata.com

## OBSERVATION & SUGGESTION

1. Electronic Resources
   (1) Virtual Collection, Digital Archive & 24/7 Availability
   (2) Needs toestablish Industry Standards
2. Target Audience – Who are you serving?
   (1) Marketing Segmentation in Library Service
   (2) Readers are customers of library – Understand their needs
   (3) SDI (Selective Dissemination of Information) in personalization(ex. the MyData service provided by udndata)
3. Alliance Cooperation and Resource Sharing
   (1) Regional library alliances can easily be formed from sharing digital information
4. Suggestions for Library Budget Reduction
   (1) Seeking other sources for funding is another option.

## LIBRARY IN DIGITAL TIMES

1. Reading can be as important as Search
2. Following life style changes：Combining multi-device mobile reading & library service

3. Balancing publishers, content service providers & readers' needs in new library service


# Posters

# An Automatic Literature Review Generation Method for Information Science Research Papers

**Kokil Jaidka**
Wee Kim Wee School of Information
Nanyang Technological University, Singapore
{E-mail: kokil@pmail.ntu.edu.sg}

## ABSTRACT

The purpose of this study is to develop a method for generating literature reviews from a set of research papers. Its contribution will lie in developing novel approaches for selecting information and generating output, by modeling it to resemble a human-written literature review. For this purpose, the features of human-written literature reviews are identified through macro-level and clause-level discourse analysis. Information selection strategies are analyzed by mapping referenced information to source documents. Preliminary results have helped to characterize the styles and structure of literature reviews. On the basis of these findings, document templates have been designed which model the layout of a human-written literature review, and sentence templates have been designed which model the way writers have used linguistic patterns to fulfill different functions in the text. In future work, an information selection method will be modeled based on the pReferences writers have shown in selecting and editing information from source papers.

## INTRODUCTION

The overall aim of this project is to develop an automatic method to summarize research papers and generate a summary emulating a human-written literature review. In order to do so, we are conducting analyses of the text characteristics and structure of naturally-written literature reviews, and researchers' pReferences in information selection and summarization for a literature review. In our exploratory study, we have analyzed 50 literature review sections of research papers from three information science journals, namely Journal of the American Society for Information Science and Technology (JASIST), Journal of Documentation (JDOC) and Online Information Review (OIR). Initial results are outlined in this poster. The research questions posed are:

- What are the linguistic and functional characteristics of literature reviews?
- How can a computer program generate a multi-document summary of research papers to model a literature review?

## RESEARCH OBJECTIVES

Previous studies of academic writing have identified the abstracting strategies of experts (Cremmins, 1982; Endres-Niggemeyer, Maier, & Sigel, 1995). We are not studying authors directly and how they go about searching, reading, selecting information and writing the literature review. Rather, we are analyzing the characteristics of the final output, the literature review and modeling the literature review and inferring how information is selected and synthesized

from source papers. Similar to our research, some other researchers have conducted content analyses of scientific articles and literature review chapters and identified the broad rhetorical categories encountered (Teufel, Carletta, & Moens, 1999; Swales, 1990; Kwan, 2006). However, these studies have focused on analyzing thesis chapters; there has been no study of the smaller literature review section which is included in a larger research paper. We contend that these smaller literature reviews have a different rhetorical layout and require higher compression rates, and would be differently emulated in an automatic program as compared to a literature review chapter. They are personalized to serve the particular purposes of the author.

Research articles have been studied by linguists, to investigate how researchers make claims (Hyland, 2003; Pho, 2008), and by citation analysts, to investigate how and why researchers cite related work (Cronin & Shaw, 2002; White, 2004). These observations focus mainly on how *inter-personal discourse markers* are employed (for e.g., "We disagree because", "You will observe that" and so on) to signal the researchers' opinions and engage the reader in the argument. On the other hand, the purpose of my multi-level content analysis is to analyze how *textual discourse markers* are employed (for e.g., "The purpose of this study was", "In order to do so" and so on) to signal the functional and informational purpose of sentences (Hyland, 2003).

- The objectives of our content and text analyses are:
- To determine the document structure of literature reviews written as part of research papers
- To determine the rhetorical functions and linguistic devices used
- To develop templates for generating the document structure, rhetorical structure and sentences for a literature review
- To find out which parts of a source research paper do researchers select information from, and how they transform it in the reference.

Although there have been some summarization studies dedicated to generating scientific summaries (e.g., Saggion & Lapalme, 2002), they focused on generating abstracts of technical papers. Human information selection strategies have been modeled only for news summaries (Jing & McKeown, 1999). Our work is novel in that it attempts to make use of our findings on human literature review writing to model and generate a comparative literature review of related research papers.

## PRELIMINARY RESULTS OF LITERATURE REVIEW DISCOURSE STRUCTURE

This poster details the results of the exploratory phase of study. The sample set consisted of twenty literature review sections from journal articles of JASIST journal papers sampled over the years 2000-2008. The discourse analysis of literature reviews was conducted at two levels of detail – document structure and rhetorical functions used at the sentence level.

### Document Structure

A coding scheme was developed to annotate the structural elements of a literature review, focusing on the types of

information. The coding scheme was developed based on an analysis of a training set of 10 literature review sections from the sample set. The coding scheme defines a set of macro-discourse elements in a literature review. Broadly, two types of elements were defined:

- Elements which describe topics, studies and concepts, such as *topic, study, description, method, result* and *interpretation.*
- Elements which represent the reviewer's comments and critique of cited studies, such as *meta-summary* and *meta-critique.*

The consistency of annotations was assessed on a separate test set; we obtained a percentage agreement of 87%, and Cohen's Kappa (inter-coder reliability measure) of 0.848 (with a 95% confidence interval of ± 0.032) (Khoo et al., in press).

The coders also observed that literature reviews may be either *descriptive* or *integrative* in style, with different discourse characteristics. Descriptive literature reviews can be defined as ones that summarize research questions of research studies, major methods of investigation and main conclusions (Knott, 1999). From our analysis, they were found to be simple in structure with more of *topic* and *study* elements and minimal embedding of topics. On the other hand, integrative literature reviews lay emphasis on the ideas and results extracted from a number of research papers and synthesize them at a higher level (Torraco, 2005). From our analysis, they were found to be significantly more complex in structure with more embedded topics (Khoo et al., in press), and more meta-elements like *meta-summary* and *meta-critique* than descriptive literature reviews.

**Rhetorical Functions at the Sentence Level**

The next stage of analysis was at the sentence level, to identify the rhetorical functions commonly encountered in literature review sections. Rhetorical functions relate the content of a literature review to its functional purpose. They are realized through textual discourse markers (Groza, 2009) signalling information, such as "***The purpose of this study is***", "***On the other hand***", "***Researchers have found that***" and so on. The purpose of identifying rhetorical functions was because they construct the argument structure of a literature review and would help to design our literature review template at the sentence level.

From our analysis of the exploratory sample set, thirty-four rhetorical functions were identified, as well as a variety of linguistic expressions for realizing these functions (Jaidka et al., 2010). Sentence templates in the form of regular expressions were constructed from these linguistic expressions. Table 1 lists some example rhetorical functions and their linguistic realizations.

It was observed that for descriptive literature reviews, writers prefer to *describe the purpose of a study, specify the research method in a study* and *describe the results of a study*, whereas for integrative literature reviews, they prefer to *introduce a topic, find differences* and *delineate a research gap.*

**Table 1: The set of rhetorical functions which summarize similarities and differences**

| Description | Frequently Occurring Rhetorical Functions | *Linguistic Pattern* |
|---|---|---|
| **Describe the common topic** | Introduce what researchers have done | *(Some \| certain \| a number of)? researchers have (proposed \| observed \| investigated \| focused on)* |
| | Introduce topic of research literature | *The (extant \| a body)? literature (covers \| deals with \| which has)* |
| **Describe similarities in research approach** | Specify the common motivation of studies | *The motivation for (such \| these)? studies* |
| | Specify the common aim of studies | *(Many \| Most) (extant)? (studies \| work) have (explored \| focused on \| found that)* |
| **Draw out similarities in research results** | Specify corroborating/reinforcing results | *These findings were (corroborated \| reinforced) by the results of* |
| | Specify similar conclusions | *(They \| He \| She \| They \| It) (drew \| came to \| had) similar (conclusions \| results)* |
| **Find differences in research approach** | Find differences using "contrast" | *The contrast between* |
| | Find the "difference between" | *The (main \| major) difference between* |
| **Delineate a research gap** | Indicate a gap through the "few studies" argument | *(Few \| no) studies have* |
| | Indicate a gap through the "no literature" argument | *There is no (existing)? literature that* |

**Information Selection Strategies**

In the next stage of analysis, sentences in twenty JASIST literature review sections that reference previous work were mapped to the source papers to identify the location of the original information and the type of summarization performed, whether cut-and-paste, paraphrase or higher-level summary. Our results indicate that

- Researchers appear to prefer information from the *Abstract, Introduction* and *Conclusion* sections of source papers
- In descriptive literature reviews, *study* or *topic* elements in the document structure contain more cut-and-pasted or paraphrased transformations of the source information.
- In integrative literature reviews, m*eta-summary* or *meta-critique* elements apply more generalization and inferencing to combine information from multiple source papers.

**LITERATURE REVIEW GENERATION METHOD**

Our content and linguistic analysis has helped us to design document- and sentence- level templates which will

emulate a human-written literature review output, as well as develop a strategy for information selection in our automatic method. Fig. 1 shows an example template which we have constructed for our literature review generation method. It depicts an integrative review template because it is a more challenging problem which has not been addressed in previous research. The template lays emphasis on meta-elements such as comparisons and summaries and is made up of multiple *topic* elements. The *topic* elements are embedded with *study*, *meta-summary* and *meta-critique* elements. The *study* elements are be brief, comprising only a *what* element which briefly describes their objectives and principal findings. The template also provides the discourse functions which will be fulfilled at the sentence level under each element. These will be realized through sentence templates as exemplified in Table 1.

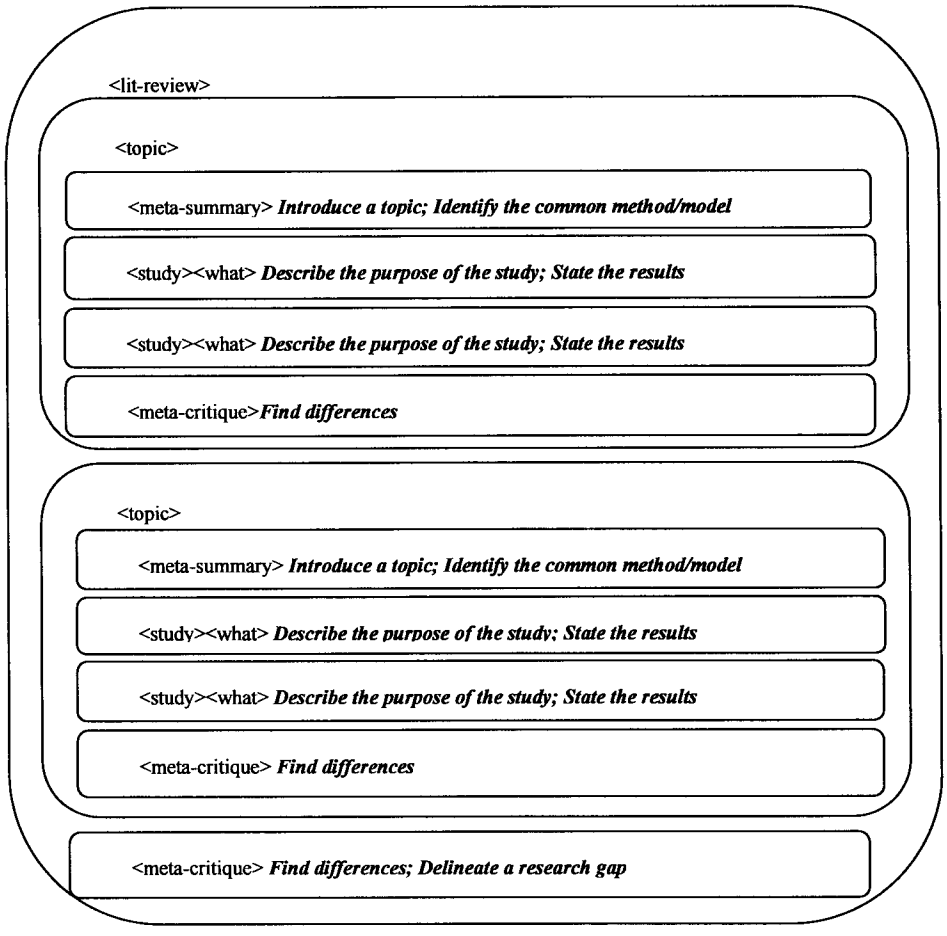


**Fig. 1: Example template for literature review generation**

## CONCLUSION

The literature review generation method described above will serve to emulate human summarization in an automatic method. It will also test the performance of existing methods in generating a summary with a specific discourse structure. Its findings will find application in the fields of discourse analysis as well as multi-document summarization.

**ACKNOWLEDGEMENT**

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**REFERENCES**

Cremmins, E. (1982). The art of abstracting. Arlington, VA: Information Resources Press.

Cronin, B., & Shaw, D. (2002). Identity creators and image-makers: Using citation analysis and thick description to put writers in their place. *Scientometrics,* 54, 31-49.

Endres-Niggemeyer, B., Maier, E., & Sigel, A. (1995). How to implement a naturalistic model of abstracting: Four core working steps of an expert abstractor. *Information Processing & Management,* 31, 631-674.

Groza, T., Handschuh, S., Clark, T., Buckingham Shum, S., & de Waard, A. (2009). A short survey of discourse representation models. In *Proceedings of the 8th International Semantic Web Conference, Workshop on Semantic Web Applications in Scientific Discourse.* Washington, DC.

Jaidka, K., Khoo, C., and Na, J.-C. (2010). Imitating Human Literature Review Writing: An Approach to Multi-Document Summarization. In *Proceedings of the ICADL* (pp. 116-119). Australia: Springer-Verlag.

Jing, H., & McKeown, K. R. (1999). The decomposition of human-written summary sentences. In F. Gey (Ed.), *Proceedings of the 22nd annual international ACM SIGIR conference on Research and development in information retrieval* (pp. 129-136). Berkeley, CA: ACM.

Khoo, C., Na, J.-C., Jaidka, K. In press. Analysis of the Macro-Level Discourse Structure of Literature Reviews. *Online Information Review.*

Knott, D. (1999). Writing an annotated bibliography. Retrieved January 16, 2009 from http://www.writing.utoronto.ca/advice/specific-types-of-writing/annotated-bibliography.

Kwan, B. (2006). The schematic structure of literature reviews in doctoral theses of applied linguistics. *English for Specific Purposes,* 25, 30-55.

Pho, P. (2008). Research article abstracts in applied linguistics and educational technology: a study of linguistic realizations of rhetorical structure and authorial stance. *Discourse Studies,* 10, 231 -250.

Saggion, H., & Lapalme, G. (2002). Generating indicative-informative summaries with SumUM. *Computational Linguistics,* 28, 497–526.

Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review,* 4, 356-369.

White, H. D. (2004). Citation Analysis and Discourse Analysis Revisited. *Applied Linguistics,* 25, 89 -116.

# Innovative University Library Reader Services in a Networked Environment

**Charter Wang**
University Library
National Kaohsiung Normal University
Taiwan
{E-mail:s1087@nknucc.nknu.edu.tw}

**Naicheng Chang**
General Education Center
Tatung University, Taiwan
{E-mail: ncchang@ ttu.edu.tw}

## ABSTRACT

This study aims to explore the transformation in the professional library and Information science and the innovation in university library reader services in the networked environment. In this study, a user survey questionnaire is applied in six universities libraries in the Kaohsiung area. The study generates recommendations as follows: 1. Setting up Learning Commons(LC); 2. Increasing the proportion of electronic resources collections; 3. Implementation of online reference services; 4. Implementation of the subject librarian.

## INTRODUCTION

The introduction of network technology is one of the most important events that affected the progress of human history in the 20th century. The networked environment enables libraries to become a node in a global network, and thus Internet-based digital technologies have become the main direction of library development. However, no matter how technology advances, library reader services always are the main concern of library service development: "the readers' needs as a first choice, the readers' satisfaction as the first pursuit." The quality of the library services environment relies on how well it can satisfy the needs of readers, expecting to provide readers with thoughtful and satisfactory services, and this is the major goal of library services.

Under the networked environment, readers who are users of university libraries, are able to get access from office, classrooms, dormitories, and home to library resources and services. Yao and Zheng (2008) pointed out that with the availability of large number of electronic databases, electronic journals, electronic books, and networked resources, electronic resources would remain the main library resources; Internet services will be the main forms of library services to readers. Library services in addition provide traditional paper media, but also extend to provide a variety of electronic publications and Internet-related information services, forming a co-existence of physical and of virtual collections. University libraries have been facing a new situation for library services; librarians therefore need to adopt new concepts and incorporate new technologies into their activities to provide different ways of services to readers.

## RESEARCH DESIGN

This study set out to address two key operational definitions of terms:

1. Reader Services

The traditional concept of library reader services is to provide knowledge services to readers. Therefore, the reader services mean that libraries provide dynamic services to knowledge-based information needs of specific readers.

2. Innovative services

The innovative services are libraries at any time in response to the needs of readers and continue to improve service quality and efficiencies, in order to set up a new milestone of the innovative university library reader services.

The research methodology used in this study is user survey questionnaires by taking a simple random sampling to randomly selected readers from six university libraries in the Kaohsiung area : the National Kaohsiung Normal University, Kaohsiung University of Applied Sciences, I-Shou University, Shu-Te University, Kaohsiung First University of Science, and National University of Kaohsiung.

According to the Department of Statistics of the Ministry of Education of the Republic of Taiwan, during the education year from August 2009 till July 2010, there was a total of 57,062 faculties and students in the six universities surveyed. The study set the confidence level by 95% and confidence interval by 5%, and a total number of 400 questionnaires were circulated to readers in the six universities to be completed. The questionnaire questions are divided into five variables: 1.Frequency of library use; 2. Purpose of library visit; 3. Reader services used; 4. Library resources used; 5. Difficulties that are frequently encountered. In addition to the first variable Frequency of library use which has a single answer, the other four variables are multiple choices.

## INITIAL RESULTS

Data were analyzed and described using SPSS 18 statistical software by number of readers and percentage. A total of 389 valid questionnaires with a 97% recovery rate were received. Below are the statistical results of each variable, taking the top three and the last three. Table 1 represents an outline of the statistical results.

1. Frequency of library use

35.7% of the surveyed readers visit libraries more than twice per week, this is followed by 23.4% who visit daily, and16.2% once a week. The last three are: 1.3% of the surveyed readers visit libraries once per semester; 1.8% of readers nearly pay no visit to libraries (only through the university library websites to browse and retrieve information); 4.4% visit libraries once a month.

2. Purpose of library visit

Borrowing and returning books from libraries are the main purposes of library visits which account for 84.6%; whereas, 66.8% of the surveyed readers come to libraries for a study space (study readers' own books); the third top is 41.6% which is to use audio-visual media. The last three are: use and print materials in micro-film machines which accounts for 1.5%; 2.6% of readers come to libraries as a place to meet people; 4.1% readers come to libraries to hire a study room.

3. Reader services used

68.1% of readers use face to face, telephone or E-mail for enquiries of library services; this is followed by 32.1% of readers participating library exhibitions, lectures, films and other library activities. 30.8% of readers use campus Interlibrary Loan services from different campus libraries for books and other library resources. The last three are: borrowing other university libraries' library cards which account for 10.5%; borrowing other university libraries' library cards for temporary use which accounts for 11.3%; 14.9% of readers use the Nationwide Document Delivery System (NDDS).

4. Library resources used

Most readers use traditional paper resources which accounts for 64%; audio-visual materials 53.7%; electronic resources 47.3% is in the third place. The last three are: library reference services 8.0%; reading library e-news 8.2%; download computer software provided by libraries10.5%.

5. Difficulties that are frequently encountered

62.5% of the readers think that the most frequently encountered difficulty is to find information they need; this is followed by 45.5% of readers who point out that libraries holdings cannot meet personal use for research, teaching, and learning. The third is that 24.7% of readers do not know how to use Interlibrary Loan services. The last three are: 5.4% of readers do not know how to use library OPACs; 9.3% of readers do not know who to turn to when they have problems in using library resources; 11.6% of readers do not understand the classification scheme used for the arrangement of library resources.

**Table 1. Results of reader survey (by number of readers and percentage)**

| Variables | Top three | Number(%) | Last three | Number(%) |
|---|---|---|---|---|
| **Frequency** | More than twice a week. | 139(35.7%) | Monthly. | 17(4.4%) |
| | Almost every day. | 91(23.4%) | Nearly don't go. | 7(1.8%) |
| | Once a week. | 63(16.2%) | Once per semester. | 5(1.3%) |
| **Purpose** | Books borrowing & returning. | 329(84.6%) | Study room hiring. | 16(4.1%) |
| | For study space. | 260(66.8%) | Meeting people. Use of micro-film. | 10(2.6%) |
| | Use of library audio-visual media. | 162(41.6%) | | 6(1.5%) |
| **Services** | Ask questions. | 265(68.1%) | Use of NDDS. | 58(14.9%) |
| | Participating library activities. | 125(32.1%) | Library cards for temporary use. | 44(11.3%) |
| | Campus Interlibrary Loan. | 120(30.8%) | Library cards. | 41(10.5%) |
| **Resources** | Paper collections. | 249(64.0%) | Download computer software. | 41(10.5%) |
| | Audio-visual materials. | 209(53.7%) | Reading library e-news. | 32(8.2%) |
| | Electronic resources. | 184(47.3%) | Reference services. | 31(8.0%) |
| **Difficulties** | Cannot find information needed. | 243(62.5%) | Do not understand the classification scheme. | 45(11.6%) |
| | Can not meet personal needs. | 177(45.5%) | Do not know who can help. | 36(9.3%) |
| | Do not know how to use Interlibrary Loan. | 96(24.7%) | Do not know how to use library OPACs. | 21(5.4%) |

**N=389**

## CONCLUSION AND RECOMMENDATIONS

Nowadays, university students are often referred to as belonging to the "Net Generation ". Duderstadt (2004) considered university students in their generation grew up in a new information technology environment. They used a "plug and play" style of learning which has been deeply incorporated into their lifestyles. Librarians must recognize this situation and adjust their methods of delivering their reader services accordingly. The study generates four recommendations as follows based on this recognition and the results of the survey.

1. Setting up "Learning Commons"

According to the reader survey, more than 75% of readers still visit libraries at least once a week, and 66.8% of them are visiting to study in libraries. In response to changes in readers' characteristics, the library could provide readers with a convenient networked environment which would include friendly and easy to use web interface and the integration of electronic resources: Information Commons (IC); furthermore, libraries could provide a computer-based instruction and learning space: Learning Commons (LC) to meet the diverse needs of readers.

2. Increasing the proportion of electronic resources collections

In recent years, library collection development has been putting effort into purchasing diverse types of resources which caused a substantial academic growth of electronic resources. Because the collection resources structure has changed, readers are using more electronic library resources gradually, so the usage of paper collections and electronic collections has now changed to the ratio of 6:4. The situation is obviously changing with the years. Current library collection development policy should be in response to this and gradually increase the

proportion of electronic resources collection.

3. Implementation of online reference services

Reference service has been playing an important role in library services; yet, this study shows that only 8% library readers use this service. Therefore, providing online reference services through the Internet could be the trend. Libraries can establish digital online interactive reference services, such as E-mail, online chat, webcam, web help desk and so on to provide remote and real-time reference services.

4. Implementation of the subject librarian

This study shows that 62.5% of the readers encounter difficulties in finding the information. In addition to maintain a rich collection of resources, libraries should implement subject librarian system, that is, each subject librarian is responsible for a college. The main responsibilities of subject librarian are to collect information on subject developments、the latest progress、conference news、resources leads、new-coming books、and other information, and dissemination these information appropriately to the readers through library website, E-mail or other forms of channels.

## ACKNOWLEDGEMENT

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## REFERENCE

Hoskins, Ruth.(2005) Information and communication technology (ICT) knowledge and skills of subject librarians at the university libraries of KwaZulu-Natal. *South African Journal of Library & Information Science*, 2005, Vol. 71 Issue 2, p151-163, 13p.

Kidd, Tony.(2009) Collaboration in Electronic Resource Provision in University Libraries: SHEDL, a Scottish Case Study. *New Review of Academic Librarianship*, Apr2009, Vol. 15 Issue 1, p97-119, 23p.

Shaw, K. & pink, A.(2009) University library virtual reference services：Best practices and continuous improvement. *Australian Academic & Research Libraries*, Sep2009, Vol. 40 Issue 3, p192-205, 14p.

Walton, Graham. (2006) Learners' demands and expectations for Spaceina University a university library：Outcomes from a survey at Loughborough University . *New Review of Academic Librarianship*, Nov2006, Vol. 12 Issue 2, p133-149, 17p.

Yao, & Zheng,(2008) Library of Knowledge Economy economic functions. *Modern Information*, Jan2008, Vol. 28 Issue 1，p4-6, 3p.

# pingpong: A Platform for Designing Spaces with Human Behavioral Data

**Sho Sato, Minako Nishiura, Hiroshi Itsumural**
Graduate School of Library, Information and Media Studies,
University of Tsukuba, Japan
{Email: min2fly, mnisiura, hits}@slis.tsukuba.ac.jp}

**Tomomi Mitsuishi**
School of Informatics
University of Tsukuba, Japan
{E-mail: tomomi@klis.tsukuba.ac.jp}

**Mizuki Oka, Yasuhiro Hashimoto**
The University of Tokyo, Japan
{E-mail: mizuki@cks.u-tokyo.ac.jp; hy@sys.t.u-tokyo.ac.jp}

**Myeong-Hee Lee**
Design Office matt, Japan
{E-mail: lee@mattoct.jp}

**ABSTRACT**

This paper reports the development of a platform called the *pingpong platform* with the aim of collecting and visualizing the information on human behavior and also the outcome of a series of design workshops held for trying out this platform. With the proliferation of new technology, it has become easier for us to obtain the data of human behavior. Making good use of such collected data, new attempts have been emerged for designing spaces. In conjunction with trend, we have developed the pingpong platform by using Twitter and held design workshops at three different university campuses in Japan. The outcome shows that: 1. Human behavioral data can be easily obtained via the pingpong platform, 2. The visualization of the data greatly helps in putting the feedback to the best use for designing physical spaces.

**INTRODUCTION**

When designing a product or service, understanding human behavioral patterns, living environments and social contexts are recognized as essential insights for designing a successful product or service. Until recently, it has been thought to be difficult for us to obtain human actions in physical space, as they are usually not left on record. However, with the widespread deployment of the Internet today, large volumes of such needed data have been easily collected and analyzed via usage log analysis. Furthermore, with the developments in technology such as wireless network, mobile devices and remote sensing, the users' comments posted on their blogs and other social networking sites can also be easily gathered as samples to be observed and analyzed. It is now generally accepted to make good use of such abundant data for improving the design of Web services. Masten & Plowman (2003) call those data-gathering methods *digital ethnography* and propose it as one approach for design strategy.

With the above background, we developed a platform not only to extract and analyze human actions in physical space but also to link those data to location information. Collecting data by this platform, we started *pingpong project*

with the aim of designing spaces and establishing a continuous process in which design and its use happen iteratively.

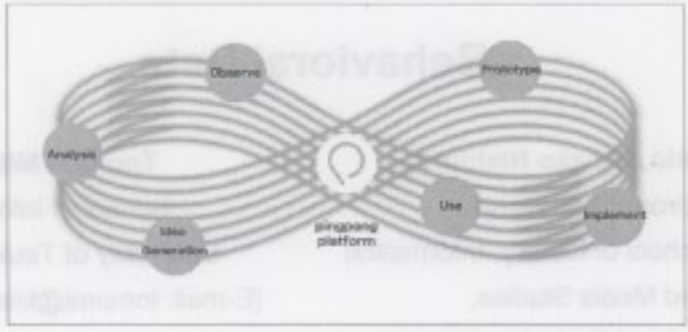


**Figure 1: The concept of pingpong project**

Figure 1 shows the concept of the pingpong project. The project was named in the hope that the iterative re-design process (cycle) would happen through the interaction between people and designs just like a pingpong match.

To conduct research on the effectiveness of the platform, we chose university campuses, and university libraries in particular, as the setting for this study. According to Casey & Savastinuk (2006) who proposed the concept of Library 2.0, it is essential to get feedback and evaluation from users of the libraries in order to continuously update the service. As the recent developments in ICT have made it possible to access information and materials easily from anywhere, university libraries are required to re-examine their role as *library as place*. Consequently, a good number of universities are establishing learning spaces called *Information Commons* or *Learning Commons* which are supposed to link cyberspace and physical space (Beagle, 2006). It is noteworthy how those new spaces are designed (Bennett, 2007). At the same time, for designing spaces, it is necessary to have evaluation for the established spaces and the concrete data on human behavioral patterns (Roberts, 2007).

However, since Information Commons or Learning Commons are newly established spaces, sufficient objective evaluation data have been yet to be gathered (MacWhinnie, 2003). Therefore, the pingpong platform which offers the mechanism of continuous extraction of users' actions and their feedback, will work well in addressing such challenges at these Information Commons. Moreover, for the pingpong project, a university or its library is an ideal environment with its network connectivity (wireless LAN…etc.) and a number of students ready for using the new tools. Based on this idea, we have held design workshops at three different university campuses in order to see how effective the pingpong platform would be to design spaces by extracting and utilizing human behavioral information. These workshops would not have been possible without the collaborative work of designers, computer scientists, library and information scientists and librarians.

The rest of the paper is organized as follows: Section 2 outlines the pingpong platform we developed for this study. In Section 3, we report our pilot user studies conducted in the form of a workshop at a university using the platform. Finally, Section 4 depicts the lessons learned from the studies as well as the possibility of this method to be used for designing libraries, and ends with a discussion and some consideration for future work.

## PINGPONG PLATFORM SYSTEM OVERVIEW

Here we introduce a set of tools for collecting and extracting user actions using the micro-blogging service, Twitter.

There are three main reasons why we have adopted Twitter as our platform; (1) Already a great many users use the service, creating its own ecosystem of social networks; (2) plenty of user guides are already available for free on the Web so that users can start using the service quickly; and (3) it offers a series of APIs that allow us to easily access the data.

Figure 2 depicts the overall flow starting from the data input by a user on a mobile device through to the visualized data shared through a web browser. The mobile device application is developed so as to gather data on what people are doing in a particular space, in this case a university campus with fine grained location information. This data is the primary data source for a design workshop described in the next sect ion.

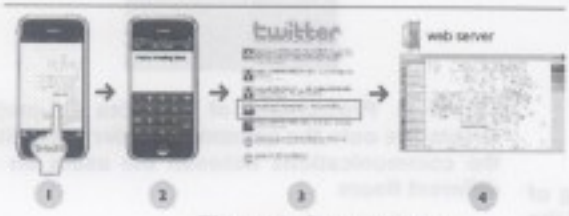


**Figure 2: Overall flow**

**(1) A user specifies location information by specifying on the application interface, (2) a user then inputs text describing about his/her behavior related to the place, (3) the input data is then posted on Twitter with the location information, (4) our web server crawls the data and visualizes it on a map on a Web browser.**

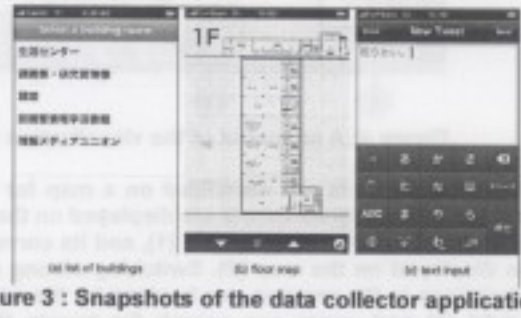


**Figure 3 : Snapshots of the data collector application.**

**(a) list of building names, (b) a floor map, and (c) text input.**

When a user launches the application, they are shown a list of building names on a university campus as depicted in Figure 3-(a). Then, after selecting one of the buildings, a screen with a floor map of the building appears in which each grid indicates 50 cm x 50 cm square meters of the actual space, depicted in Figure 3-(b). A user can post a short description about the particular place by placing a finger on to the screen, which prompts the appearance of an input box as depicted in Figure 3-(c). The input description is then uploaded to the Web using Twitter.

The data posted by a user is accumulated with the users account name, posted text, a hash-tag, X-axis of the map, Y-axis of the map, the floor number, and the building number.

For example, if a user with an account name of miz_oka posts a text I am reading here, the location information of the map (X-axis, Y-axis, and the floor number, building number) along with the hash-tag specified for the workshop (in this case #ppklc) are automatically attached and will make the following post as a tweet using the Twitter service.

*miz_oka, I am reading here, #ppklc, 283, 142, 5, 1 2010-06-15 10:35:33 JST.*

It is important to note that the hash-tag makes it possible for us to gather all the data related to the study.

All the posted tweets with the has-tag (#ppklc) are crawled from the Web and posted texts (tweets) are visualized on a Web browser as depicted in Figure 4. The visualization is provided in the form of a map in which the verb is extracted from each post and mapped using its location information. The visualization was intended as a collaborative tool, provided so as to facilitate the sharing of information among the users. Figure 4 shows a snapshot of the tool developed for the design workshop described in the next section. Only the verbs are used on the map, but the original sentence is displayed on the left part of the window in the manner of a timeline. When a user clicks a verb on the map, the

corresponding tweet is prompted and appears at the top of the timeline. Similarly, clicking a tweet on the timeline highlights the corresponding verb on the map.


**Figure 4: A snapshot of the visualization tool**

**All the posted tweets are visualized on a map for the sharing of information. The original tweets are displayed on the left part of the window in the manner of a timeline (1), and its corresponding verb tag is displayed on the map (2). Switching among different floors and buildings in the campus can be done by the using buttons on the right (3) and users can search for tweets that contains a particular keyword by inserting a query into the search box (4).**

**Figure 5: Prototyping of the idea to project tweets live onto the columns in order to facilitate the communications between the users on the different floors**

## IMPLEMENTATION: THREE WORKSHOPS ON ACADEMIC LIBRARIES AND A UNIVERSITY CAMPUS

As mentioned above, with the aim of evaluating the validity of designing spaces by utilizing the data collected via the pingpong platform, we held design workshops at three different university campuses in Japan; Tama Art University Library; Media Library, Future University Hakodate and Kasuga Area, University of Tsukuba. In these workshops, after collecting human behavioral data (tweets) for the space or the field via the pingpong platform, the student participants deepened their understanding of the field by analyzing gathered tweets, identified problems and their causes, generate new ideas to solve the problems, and prototyped the idea in the final phase. Each workshop was conducted over four days. During the study period, we enabled anyone to tweet by using the pingpong platform and, furthermore, encouraged the workshop participants to post their own everyday activities.

### Case1: Tama Art University Library

Period: October 2009

Total number of participants: 7 (six undergraduate students and one librarian)

Total number of tweets: 612

Main findings and outcomes: In the case of Tama Art University Library, the participants themselves posted their behavioral information using Twitter and also created a map. They printed out each tweet on stick-on notes and put it on the map by hand. Later the map created in this manner became the prototype of the current pingpong map.

From the results of the analysis by the workshop participants, we found out an unconscious gap between the people's actual actions and what they truly desired to do in the library. In addition, it was revealed that some

facilities made by a designer with the intention of bridging the library and the users were not used and even paid any attention at all.

**Case2: Media Library, Future University Hakodate**

Period: February 2010

Total number of participants: 15 (12 undergraduate and graduate students from Future University Hakodate and three students from other universities).

Total number of tweets: 661

Main findings and outcomes: A part of Media Library is built in an open interior space first to fifth floor with some pillars supporting the building. From the data analysis with the pingpong platform, it was discovered that this overlook and those pillars were not put to good use, even if the users intended to do so. Therefore, they proposed to implement the idea to project live tweet onto the pillars in order to facilitate the communications between people on the different floors (Figure 5). At present, it is being negotiated within the university, whether to make this a permanent implementation.

**Case3: Kasuga area, University of Tsukuba**

Period: May – July 2010

Total number of participants: 18 undergraduate and graduate students (from University of Tsukuba)

Total number of tweets: 3,373

Main findings and outcomes: Through the workshop, it became clear that the users of the pingpong map could follow along with the actions of various people in different clusters, which to greater or lesser extend affected by users' own perception about each place and range of their activities within that space. In the hope of publicizing and spreading the pingpong map across the campus in order to vitalize the space and the people, the workshop participants proposed an implementation plan using a speaker, a laser, and an architectural model of the campus combined with the pingpong map, in a hope that it would strengthen the effects of audio-visual stimuli on the users. To be concrete, they have come up with the mechanism in which a vocalized tweet would be heard from the speaker, and location information would be indicated by the laser and the architectural model. Presently, negotiations are taking place in the university to actually implement it.

**CONCLUSION**

In this study, we have developed the pingpong platform by using Twitter as a means to collect human behavioral data from physical space and a visualization software in order to establish the iterative cycle or feedback loop for designing spaces. We have reported a series of design work shops held at three university libraries by using our platform, which enabled us to easily obtain abundant data on users' behavior and their consciousness in the libraries. Through the workshops, some cases were found to have a gulf between the library designer's intention and the users' actual behavior, and some proposals for solution are given by the participants. In this regard, the pingpong platform is shown to be

beneficial as a tool to collect human behavioral information and utilize the data to create an effective iterative process for designing spaces.

Contrary to our expectation, the number of tweets has been decreasing at every university since the workshop ended, which indicates the use of the platform is still transient. Thus, one of our future challenges is how to embed pingpong platform in everyday lives of humans so that the constant cycle of design and feedback will be realized between physical space and cyberspace.

## ACKNOWLEDGEMENT

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## REFERENCES

Beagle, D. R. (2006). The information commons handbook. New York: Neal-Schuman.

Bennett, S. (2007). First questions for designing higher education learning spaces. *The Journal of Academic Librarianship*, 33(1), 14-26.

Casey, M. E., & Savastinuk, L. C. (2006). Library 2.0. *Library Journal*, 131(14), 40-42.

MacWhinnie, L. A. (2003). The information commons: the academic library of the future. *portal: Libraries and Academy*, 3(2), 241-257.

Masten, D., & Plowman, T. M. P. (2003). Digital ethnography: the next wave in understanding the consumer experience. *Design Management Journal*, 14(2), 75-81.

Roberts, R. L. (2007). The evolving landscape of the learning commons. *Library Review*, 56(9), 803-810.

# Could Social Tags be Enhanced with a Faceted Structure? An Experimental Study on Book Tagging

**Yi-Chen Chen, Muh-Chyun Tang**
Dept. of Library and Information Science
National Taiwan University, Taiwan
{E-mail: yzchen@gmail.com; mctang@ntu.edu.tw}

**ABSTRACT**

Recently, social tagging has been suggested as the supplement to traditional ways of information organization. However, the effectiveness of tagging in information discovery and retrieval is still in question. Our approach is to develop a framework of structured tagging with a faceted classification. This study sets out to test the effectiveness and feasibility of this faceted template designed to facilitate elicitation of tags to support semantic browsing and searching. In the study, an experiment was conducted to compare faceted structure-based tagging with freely assigned tags of the same books, particularly in the context of fiction and non-fiction. Thirty-two participating users were assigned to either experimental group or control group depending on the provision of faceted structure. Through this study, we investigated how the facet-based tagging as a crucial factor provides a solution for the issue on information discovery and subject access to books.

**INTRODUCTION**

Libraries have used various organization systems, such as descriptive cataloging and subject indexing, to provide bibliographic and subject access in online catalogs. Although it is useful to improve information retrieval performance, it is still inadequate to express the subject content of books and to access digital collections via browsing or navigation.

Recently, social tagging has been suggested as the supplement to traditional ways of information organization because it does not put any limitations on the users and allows them to freely attach keywords or tags to digital resources (Golub, et al., 2009). The potential advantages of tagging are often addressed by its lower cost, flexibility, diversity, and novelty. However, despite these advantages, several studies have questioned the effectiveness of tagging in information discovery and retrieval. Since there is no guidance or manners during the tagging process, the user-created tags are completely uncontrolled and unstructured, resulting a lack of precision, semantic interoperability, and disambiguation of homonyms (Guy & Tonkin, 2006). To address these problems, some researchers (Bar-Ilan, et al., 2006; Smith, 2008) pointed out that the next wave of tagging systems must impose more structure and accept less ambiguity in tags. This calls for designing a better tagging system for users to avoid the problems mentioned above and to enhance the quality of tags.

Our approach is to develop a framework of structured tagging with a faceted classification. And this study sets out to test the effectiveness and feasibility of this faceted template (or classification scheme) designed to facilitate elicitation of tags to support semantic browsing and searching. While previous literatures have well acknowledged the suitability of

faceted classification as a retrieval and navigational aid to access documents in digital libraries or portals (Broughton, 2006), very few of them exploit the usefulness of facet-based tagging and investigate how users experience when assigning tags with a faceted structure (Quintarelli, Resmini, and Rosati, 2007). Accordingly, this study conducted an experiment to evaluate the benefits introduced by this approach, and to compare faceted structure-based tagging with freely assigned tags of the same books, particularly in the context of fiction and non-fiction works.

## RESEARCH QUESTIONS

The overall objective of this research is to propose a faceted structure for book tagging, with a view to enhancing the quality of tags for increased semantic interoperability and retrieval performance. Feasibility and benefits of the combination of tagging and faceted structure are also explored. In particular, our main research questions can be stated as follows:

Q1. Does faceted structure influence the quality of book tags and users' tagging experience compared with normal tagging system?

Q2. If so, does the influence of faceted structure on tagging differ with the genres of the works (i.e., fiction vs. non-fiction)?

Q3. What are users' general impressions of our proposed faceted structure for book tagging, and how do they feel when inputting tags with a pre-defined structure?

## RESEARCH DESIGN

### The Experiment

This experiment aims to understand the effect of different tagging modes and genre of works on the resulting tag sets of books. As Table 1 shows, the participating users were assigned to one of two groups depending on the provision of faceted template available to them. Accordingly, we constructed two kinds of tagging interface: one for the experimental group; the other for the control group (see Figure 1 and Figure 2). Participants of the experimental group were asked to fill tags in a structured form containing the following fields: "genre", "author type", "content of the book" (including "subject area", "characters/people", "setting/location", "timeframe", and "topics"), "writing style", "personal opinion", and "other facets". The definitions of each field or facet were shown on the interface as guidance, and participants were told that not all the fields are necessary to all the titles. The control group were asked to input tags in the form of ten empty textboxes without any structure. In addition, totally sixteen books comprising eight fiction and eight non-fiction works selected for the study were to be tagged by each participant. Both groups were instructed to provide tags that would enable retrieval of these books in the future by other users.

At the beginning of the experiment, each participant had to complete a pre-study questionnaire in which background information about the participants will be collected. After the tagging session, participants were asked to complete a post-study questionnaire which served to collect information about the participants' use experience, perceived utility and satisfaction with the results and the interface in general.

This experiment involved 32 participants who completed the study. They were either college students or graduate

students. Based on a pre-study questionnaire, it was found out that they were all experienced web users; twelve of them had used tagging applications before. The majority had little acquaintance with the materials selected for the research before doing the tagging; each participant had read only 2.5 titles on average.

The independent samples t-test was performed to guarantee that there are no systematic background differences between the two groups except the intervention of the treatment variables.

**Table 1. The factorial design of the experiment**

| | | Provision of the faceted structure (between-subjects) | |
|---|---|---|---|
| | | experimental group *N=16* | control group *N=16* |
| Genre of works (within-subjects) | Fiction | Tagging fiction and non-fiction works via a faceted structure | Tagging fiction and non-fiction works without any structure |
| | Non-fiction | | |

**Figure 1: Tagging interface for the experimental group**

**Figure 2: Tagging interface for the control group**

**Data Analysis**

The main data collection methods were experimenting faceted structure to elicit tags, recording each participant's tagging session with transaction log, and gathering participants' general impressions from the questionnaire. In order to quantitatively assess the resulting tag set assigned to books (both fictions and non-fictions), we use the following criteria: the average number of tags, the number of distinct tags, the degree of tag similarity, convergence of tags, and the distribution of tags by facets. In addition, the cost of the tagging process was evaluated by some criteria: length of time taken, times of reviewing pages, times of editing tags, perceived ease of use, and perceived successfulness. Also, participants' use experience on both groups of participants was compared.

**PRELIMINARY RESULTS**

As shown in Table2 to Table4, there was a statistically significant difference between the experimental and control group in the average number of assigned tags, the length of time spent on tagging, and the participants' perceived successfulness of the tagging process. According to the results of assessment, it was found that the tag sets of faceted template display more distinct tags, more number of assigned tags on average, higher degree of tag similarity, and higher convergence of tags. More number of tags suggests that faceted template is conducive to indexing specificity and exhaustivity, and higher degree of tag similarity suggests higher degree of consensus among participants. For higher convergence of tags, as proposed by Wolfram & Zhang (2002), it reveals that a steeper term distribution produce more distinctions among documents because more terms are assigned per document and fewer common terms are shared among documents, resulting in the document's distinctiveness. Additionally, results about "the distribution of tags by facets" show that tagging via faceted structure generally produces more tags within each facet and covers more facets.

**Table 2. Results of ANOVA by the average number of tags**

| Source | SS | df | MS | $F_0$ | *p*-value |
|---|---|---|---|---|---|
| Between groups | 89.011 | 1 | 89.011 | 10.889* | .002 |
| Error (within) | 245.224 | 30 | 8.174 | | |
| Total | 334.235 | 31 | | | |

**Table 3. Results of ANOVA by length of time taken**

| Source | SS | df | MS | $F_0$ | *p*-value |
|---|---|---|---|---|---|
| Between groups | 5858.129 | 1 | 5858.129 | 48.653* | .000 |
| Error (within) | 3612.192 | 30 | 120.406 | | |
| Total | 9470.321 | 31 | | | |

**Table 4. Results of ANOVA by perceived successfulness**

| Source | SS | df | MS | $F_0$ | *p*-value |
|---|---|---|---|---|---|
| Between groups | 13.781 | 1 | 13.781 | 14.538* | .001 |
| Error (within) | 28.437 | 30 | .948 | | |
| Total | 42.219 | 31 | | | |

Despite the quality of the tag set, our findings about the cost of tagging indicate that using faceted template usually takes more time and effort, and a large amount of users feel less satisfied and less confident of the resulting tag sets. In particular, participants using faceted template experienced more difficulty when tagging fiction works. According to the post-study questionnaire, most participants agree that the faceted classification would be helpful for tagging and for retrieval, but less than half of them have the willingness to use this kind of tagging interface in the future. One possible explanation is that each user has an individual need and viewpoint on the classification of tags, and not all facets/fields provided in this study are appropriate for them to describe each book. Therefore, a fixed and single structure may discourage the users from using faceted template.

## CONCLUSION

Social tags are often suspected to be insufficient for further objects indexing and retrieval due to the unorganized and unstructured feature. To explore this issue, our study conducts an experiment to investigate whether user-generated tags can be enhanced with the specific faceted template particularly on book tagging. Two different kinds of tagging interfaces (providing the structure or not) and two different genre of works (fiction and non-fiction) are manipulated in this experiment. Although it is hard to make clear conclusions based on one single study, we suppose that the quality of user-generated tags would be enhanced with the faceted classification scheme because of the more number of tags assigned to books and the multifaceted tagging. Nevertheless, the actual retrieval effectiveness of the combination of tagging and faceted structure still has to be examined and assessed in further empirical research.

## REFERENCES


Bar-Ilan, J., Shoham, S., Idan, A., Miller, Y., & Shachak, A. (2008). Structured versus unstructured tagging: a case study. *Online Information Review, 32*(5), 635-647.

Bar-Ilan, J., Zhitomirsky-Geffet , M., Miller, Y., Shoham, S. (2010). The effects of background information and social interaction on image tagging. *Journal of the American Society for Information Science and Technology, 61*(5), 940-951

Broughton, V. (2006) The need for a faceted classification as the basis of all methods of information retrieval. *Aslib Proceedings, 58*(1/2), 49-72.

Chen, Y.-C. (2008, November). *Analysis of social tagging and book cataloging: A case study.* Paper presented at the HKLA 50th Anniversary Conference, Hong Kong.

Golder, S. A. & Huberman, B. A. (2006). Usage patterns of collaborative tagging systems. *Journal of Information Science, 32*(2), 198-208.

Golub, K., Jones, C., Matthews, B., Puzoń, B., Lykke Nielsen, M., Moon, J., and Tudhope, D. (2009, June). *EnTag: Enhancing Social Tagging for Discovery.* Paper presented at Joint Conference on Digital Libraries, JCDL 2009, Austin, Texas.

Guy, M., & Tonkin, E. (2006). "Folksonomies: Tidying up Tags?" *D-Lib Magazine, 12*(1), np-np. Available at: http://www.dlib.org/dlib/january06/guy/01guy.html

Hammond, T., Hannay, T., Lund, B., & Scott, J. (2005). Social Bookmarking Tools (I): A General Review. *D-Lib Magazine, 11*(4) , np-np. Available at: http://www.dlib.org//dlib/april05/hammond/04hammond.html

Heckner, M. , Mühlbacher, S. ,& Wolff, C. (2008). Tagging tagging. Analysing user keywords in scientific bibliography management systems. *Journal of Digital Information, 9*(27). Retrieved July 2, 2008, from: http://journals.tdl.org/jodi/article/view/246

Lin, X., Beaudoin, J. E., Bui, Y., & Desai, K. (2006). *Exploring characteristics of social classification.* Paper presented at 17th Annual SIG/CR Classification Research Workshop, Austin, TX.

Matthews, B., Jones, C., Puzoń, B., Moon, J., Tudhope, D., Golub, K., and Lykke Nielsen, M. (2009, June). *An evaluation of enhancing social tagging with a knowledge organization system.* Paper presented at ISKO UK Conference, London. Available online: http://www.iskouk.org/conf2009/papers/matthews_ISKOUK2009.pdf

Quintarelli, E., Resmini, A., & Rosati L. (2007). *FaceTag: integrating bottom-up and top-down classification in a social tagging system.* Paper presented at International IA Summit 2007, Las Vegas, Nevada, United States. Available at: http://www.facetag.org/download/facetag-20070325.pdf

Smith, G. (2008a, April). *Tagging: Five emerging trends.* Paper presented at IA Summit 2008, Miami, Florida. Retrieved 3 March 2009, from: http://www.iasummit.org/proceedings/2008/tagging_five_emerging_trends

Smith, T. (2007) Cataloging and You: Measuring the Efficacy of a Folksonomy for Subject Analysis. In Lussky, Joan (Eds.), Proceedings 18th Workshop of the American Society for Information Science and Technology Special Interest Group in Classification Research. Milwaukee, Wisconsin.

Spiteri, L. F. (2007). Structure and form of folksonomy tags: The road to the public library catalogue. *Webology, 4*(2). Retrieved June 18, 2008, from: http://www.webology.ir/2007/v4n2/a41.html

Weaver, M. (2007). Contextual metadata: faceted schemas in virtual library communities. *Library Hi Tech, 25*(4), 579-594.

Wolfram, D. & Zhang , J. (2002). An investigation of the influence of indexing exhaustivity and term distributions on a document space. *Journal of the American Society for Information Science and Technology, 53*(11), 943-952

Xu, Z., Fu, Y., Mao, J., & Su, D. (2006). *Towards the semantic web: Collaborative tag suggestions.* Paper presented at the Collaborative Web Tagging Workshop at WWW2006, Edinburgh, Scotland, United Kingdom. Available at: http://www.semanticmetadata.net/hosted/taggingws-www2006-files/13.pdf

# The Behaviors of Book Selection under Utilitarian and Hedonic Scenarios: A Case Study on books.com.tw

**Yi-Jin Sie, Pei-Ning Li, Si-Yin Wen, Shu-Ping Lee**
National Taiwan University, Taiwan
E-mail: {r98126003; r98126002; r98126005; r98126006}@ntu.edu.tw

## ABSTRACT

The paper reported results from an experimental research conducted in books.com.tw that aimed at investigating user's books choosing behavior in different scenarios, utilitarian and hedonic. The research is motivated by Lens model in cognitive psychology. When conducting contextual tasks, Morae interface shot software, think-aloud, and questionnaire were employed. After tasks, a semi-structure interview was carried out. The results show that in addition to title, preview, introduction and category, users utilize different cues to help them make decisions when choosing books. In utilitarian scenario, users tend to use author and Top 5 to help them make decisions, whereas in hedonic scenario, users are likely to use cover and date. From research interview, users consider preview and recommendation as important cues; thus, it suggests that books.com.tw should provide as many content previews as possible for customer/ user to make decisions. Also, hyperlink of special recommendation from books.com.tw should be placed more obviously.

## INTRODUCTION

With the popularity of the Internet, people are used to purchasing a variety of goods via the Internet. Amazon.com is the website in the limelight recently, which creates unique online shopping experience and changes people's search behavior. When people choose books in website, they cannot either touch the book or read the contents of the book to make sure whether to buy or not. In such case, online bookstores have to provide extra information for users to help them make decisions. Like Amazon.com, books.com.tw is the largest online bookstore in Taiwan.

Many studies of books.com.tw focus on commerce activities such as customer purchase intention, customer loyalty, and marketing strategy etc. (Tseng, 2001; Chen& Chen, 2009; Feng, Huang, & Yeh, 2009), but less on users' searching behavior. Therefore, in this study, we specifically examine how the provision of varied information impacts consumers' decision making behavior by comparing search processes. Based on Lens model (see figure1), people's judgment processes as "lens of cues" that divide the events and objects in the real world from the psychological processes in the mind of the person while making a judgment (Brunswick, 1952). When choosing books, people will depend on different cues, such as title, author or content etc, to identify whether to select the book or not. In the information rich online environment, how people choose cues as reference point for decision? Online consumers are known to actively search for cues such as decision aids and comparison agents that might assist them (Smith, Menon, and Sivakumar, 2005). As far as people are concerned, those cues used in decision making process represent the information validity (Tang, 2009). People infer the contents and relevance of the book from those information cues to make the final decision.

Further, we want to know what kind of cues people choose to use for different shopping motivations. According to

2009 books.com.tw report (趙靜瑜，2009), data shows that nowadays people prefer believing reviews written by customers who share their feelings, rather than by experts. However, with different shopping goals, people may rely on different information. It means one kind of information useful in specific shopping goal may be useless in another. Motivations to engage in retail shopping have both utilitarian and hedonic dimensions. In contrast to utilitarian purchases, which are guided by cognitive beliefs about functional attributes and mostly sought to meet instrumental or functional needs, hedonic purchases pReferences are likely to be heterogeneous and are consumed for socio-emotional benefits and experiential aspects of fantasy, fun, and pleasure. (Feick & Higie, 1992; Childers, Carr, Peck, & Carson, 2001). Hence, we try to find out how people choose books in utilitarian and hedonic scenarios.

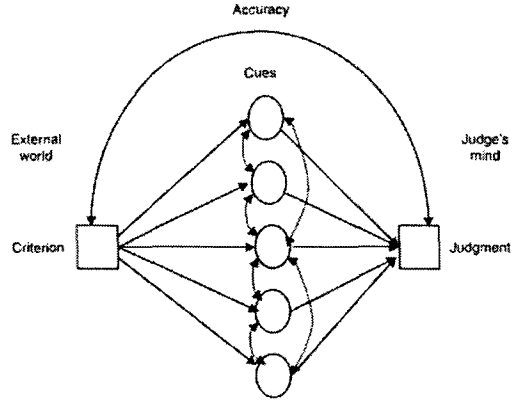


**Figure 1: A Schematic diagram of Brunswick's lens model for conceptualizing judgment**

## RESEARCH DESIGN

Experiments are conducted at National Taiwan University in May 2010. There are 3 questionnaires, 2 tasks and one interview for subjects to complete in this study. We create 2 scenarios — utilitarian and hedonic. We assume that in utilitarian scenario, the information people sought for is to satisfy the functional needs. For instance, one failing in investment may lead to go bankrupt. Therefore, as people try to find something about investment, they will be more cautious about evaluating information. On the other hand, in hedonic scenario, what people do is for fantasy, fun, and pleasure. Thus, people may value different aspects of information which would catch their attention and fit in with interests. For example, people may feel delightful when planning a trip, or when considering how to decorate their rooms (Scenario details are as Appendix 1.).

We create three different tasks in each scenario, which means that there are 9 combinations (3x3) of tasks. Sequence effect is tackled with different order of those two scenarios (see table 1). Hence, we have 8 graduate students as research subjects and one for pretest to complete those tasks. One subject will complete two tasks, one for utilitarian scenario and one for hedonic scenario.

**Table1. Sequence effect controlling**

| | | Utilitarian(B) | | |
|---|---|---|---|---|
| | | (B1) | (B2) | (B3) |
| Hedonic (A) | (A1) | A1 B1 | A1B2 | A1B3 |
| | (A2) | A2B1 | A2B2 | A2B3 |
| | (A3) | A3B1 | A3B2 | A3B3 |

Before the experiment start, we use the questionnaire to realize backgrounds and reading habits of subjects. In experiment process, when finishing one task, subjects take a short questionnaire about the information utility of the books.com.tw and what cues they used in the task. When finishing two tasks, there is a semi-constructed interview for subjects. The final interview focuses on decision-making process, questions like "What do you expect to see while you click the category?" and "Why do you move on seeking recommendation lists after browsing search results?" are asked (See Figure 2).

Reasons for choosing graduate students as subjects are that graduates seem to have more research experiences and will endeavor themselves to search for the "best" answer. Therefore, it is more possible that graduate students would combine past experiences with information cues in order to assist them to make good decisions. Also, according to research of Wang (2000) and Hu, Hu, & Luo(2004), researchers find out that graduate students' searching ability is greater than undergraduates and that graduate students have greater confidence in searching ability. It means graduate students will show confidence in choosing cues and they know what kinds of cues are useful in the process of decision making.

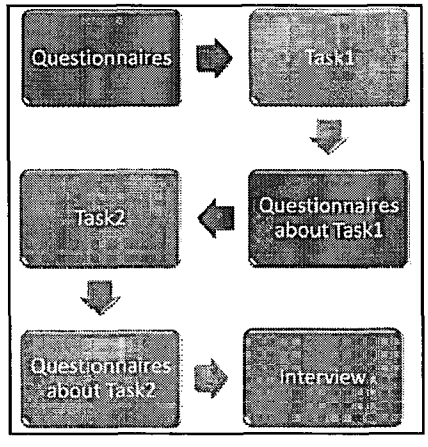


**Figure 2: The research flow chart**

To match up with the proportion of male and female graduates of National Taiwan University, our subjects consist of 5 men and 3 women from different departments. Those subjects should have used the interface of books.com.tw in the latest month, in case that they are unfamiliar with the interface. In order to promote subjects' motivation, we offer inducement after every subject complete the test.

Morae, software for interface shot, is employed in this study. It is a kind of software to record the users' navigation history, to make notes and tag subjects' behavior in tasks in real time. We also apply in this study "think-aloud", or verbal protocol methodology, which has been widely employed for usability testing of system design. (Ericsson & Simon, 1993) The fundamental concept is that subjects are able to accurately verbalize their thought processes while attending to a task. These verbalizations can later be analyzed for cues regarding decision-making processes.

## INITIAL RESULTS

According to subjects' routes of browsing and thinking, we utilize Morae, professional software of screen recording, to mark every item on the webpage that subjects browse. Each cue they mention in "think-aloud" will be marked as a tag. We count the number of times used of each tag and try to analyze what kind of cues are used most. We make a diagram to show amount of cues used to indicate that which cue is important for subjects when they make decisions in these two scenarios. When subjects have blurred memory about the mission and want to make sure their guesses, we also allow them using Google to search, thus conforming to their internet browsing habits.

From the browsing route, we discover Title, Preview, Introduction, and Category are much more important to assist making main decisions. Though using similar and general cues to make decisions, in different scenarios, subjects also pay attention to different cues excluding the four cues above. In utilitarian scenario, subjects tend to use Author and Top 5 to help them make decisions; however, in hedonic scenario, subjects are likely to use Cover and Date when choosing books. According to the research results, we revise the Lens model Brunswick proposed (see figure3), which explain how people apply cues around them to make judgments when choosing books in varied scenarios.

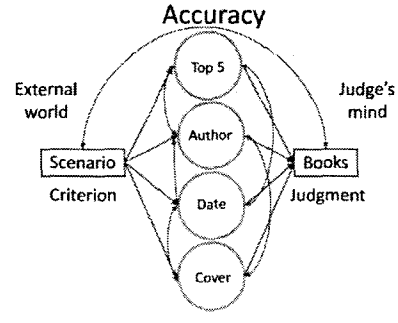


**Figure 3: Revised lens model**

To better understand how subjects choose cues in different scenarios, we construct their browsing road maps to observe and make it clear to compare (see figure4 & figure5). In browsing road maps, arrows stand for browsing sequences and circles stand for cues. The percentages shown in the figure represent that how many times those cues were clicked by subjects through the whole browsing process. In utilitarian scenario (see figure 4), peopl

e value Top5 and Author highly because the former indicates the wisdom of the crowd, and the latter represents the authors' authority in that field. In hedonic scenario (see figure 5), people value Date and Cover highly because the former indicates novelty of information, and the latter shows the style of the book.

To realize process of making decisions, we describe the subjects' behaviors in the two scenarios respectively. In utilitarian scenario, after glancing through Author's name, subjects may decide to use Author's name as another keyword or to start another new search. When users have no idea about how to continue browsing, they are inclined to use Top 5 to get some information. In Hedonic scenario, when choosing books for interior design and backpackers/ individual travel, subjects pay more attention to Date and Cover. Since subjects usually take the novelties of books into consideration, they may rank search results by Date. Additionally, we also find that subjects may give up browsing if there is no Cover preview.

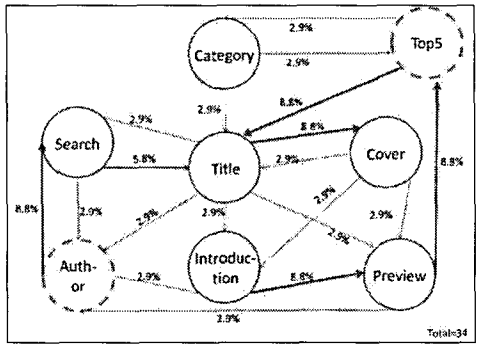


**Figure 4: Reference cues in utilitarian scenario**

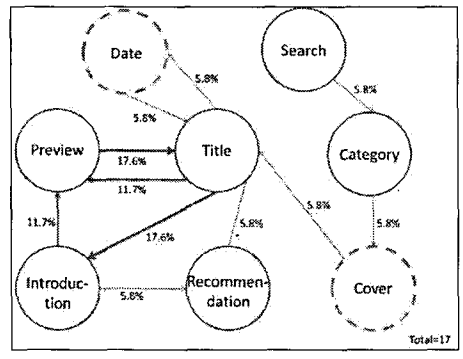


**Figure 5: Reference cues in hedonic scenario**

After subjects finish the two scenario tasks, we ask if they could differentiate scenarios from the two tasks. Some think the two tasks they are asked to complete are indeed different. Actually, no matter how subjects classify the two missions, according to their practical cues choosing behaviors in two missions are obviously distinct. It indicates that tasks designed fit in with the two scenarios we design. Subjects choose different cues to assist making decisions in different scenarios.

## SUGGESTIONS

We have examined how people choose books in utilitarian and hedonic scenarios. The results show that in addition to traditional book information, such as title and introduction, people also seek for extra cues to help them make decisions in different scenarios. Based on this finding, service providers should offer users with informative cues to help them make decisions. For instance, we discover that people choose books by covers in hedonic scenario. Leisure reading books with proper covers may intrigue them to select the book or not. For this reason, it is better to show cover information in search results rather than in book description page. In addition, we have learned that people seek for the wisdom of crowd and overall opinions in utilitarian scenario. Therefore, it is better to provide others' opinions as a way for people choosing reference books to consult and take into consideration. Based on wisdom and power of crowd mentioned and practiced frequently on Internet, service providers could utilize social navigation tools, such as ranking, review, and recommendation, to support users who are not familiar with the topic. It is obvious that people tend to use social navigation tools to realize what books are read, recommended, and reviewed most; additionally, they depend heavily on them to make decisions. It is appropriate to regard social navigation tools as great indicators to assist users in browsing process.

However, in this study, though books.com.tw indeed provides social navigation tools to provide extra information, it does not work well. Subjects sometimes cannot find information needed or they may lack of information in such an information rich environment, which indicates that interface still need to improve. First, books.com.tw should provide as many content previews as possible for customer/user decision making. Users are accustomed to reading the contents of books and then making decisions about which books fit in with their information need. When choosing books in online bookstores, process of content preview browsing is similar to reading books in real life. It provides practical experiences and more cues to assist users to make correct decisions and also combines experiences of practical reading with choosing books in virtual and online bookstores. Moreover, hyperlinks to recommendation of special items in books.com.tw should be placed more obviously. Facing unfamiliar topics and making decisions, users are looking forward to

recommendation lists and depend on the lists to get more cues and professional suggestions. Though books.com.tw certainly offers this kind of recommendation service, subjects usually give up the service because of its unobvious location on the webpage. The most important thing to do is placing the link of recommendation lists at an obvious location of browsing route. It represents an official recommendation about the online bookstore as reference resources and cues. Furthermore, as what the results show, books.com.tw could consider how to provide information to correspond with users' needs. In order to create a seamless online shopping environment for users to use, books.com.tw should provide information more organized and obvious.

The future research could include personal backgrounds concerning users' browsing and books choosing behaviors. What we want to know is what kind of professional knowledge and experiences that cause users choosing different cues in different scenarios, and what relationships between each other.

**ACKNOWLEDGEMENTS**

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**REFERENCES**

趙靜瑜〈 2009年12月29日〉。博客來報告出爐 青少年最愛暮光之城。自由時報，藝術文化。

Brunswick, E. (1952). *The Conceptual Framework of Psychology*. University of Chicago Press.

Chen, G. W. & Chen, Y. W.(2009). The Study on the Relationship of Service Quality, Perceived price, Customer Satisfaction and Repurchase Intention of Online Bookstore for the National College Students in Taipei: The Case of books.com.tw. Unpublished doctoral dissertation, Institute of Business & Management, National Chiao Tung University.

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and Utilitarian Motivations for Online Retail Shopping Behavior. *Journal of Retailing, 77*(4), 511-535.

Ericsson, K. A., & Simon, H. A. (1993). Protocol Analysis: Verbal Reports as Data. Cambridge, MA: MIT Press.

Feick, L., & Higie, R.A. (1992). The Effects of Preference Heterogeneity and Source Characteristics on Ad Processing and Judgments about Endorsers. *Journal of Advertising, 21*, 9–24.

Feng, C. M., Huang, Y. K., & Yeh, Y. S.(2009). *Customer Loyalty of On-line Bookstores for Consumers of Retailing Delivery Service*. Unpublished dissertation, Institute of Traffic and Transportation, National Chiao Tung University.

Hu, C. S., Hu, Y. J., & Luo, L. X. (2004). Analysis of the Self-Evaluation Concerning Information Literacy Levels of Pre-Service Teachers. *Instructional Technology & Media, 69*, 55-67.

Smith, D., Menon, S., and Sivakumar, K. (2005). Online Peer and Editorial Recommendations, Trust, and Choice in Virtual Markets. *Journal of Interactive Marketing, 19*(3):15-37.

Tang, M.C. (2009). A study of academic library users' decision-making process: a Lens model approach. *Journal of Documentation, 65*(6), 938-957.

Tseng, H. U.(2001) .*The Experiential Marketing Research of Online Bookstore-A Case Study of The BOOKS.COM Co., Ltd.* Unpublished doctoral dissertation, Department of Information and Communications, National Shih Hsin University

Wang, K. C.(2000). *A Study on Central Police University Library Users Information Literacy*. Unpublished dissertation, Department of Library and Information Science, Fu Jen Catholic University.

**APPENDIX 1**

1. Utilitarian scenarios

1.1

Since the 'Hot Blood' company has not been working well lately, the manager wants to reorganize the company structure, hoping to integrate each department to improve internal communication and work efficiency. However, it is not easy to make changes because operative goals and organizational levels setting of the company are involved in reorganization. The manager is now pondering about how to tactfully propose this idea to the chairman of the board, without letting the chairman feels like he/she has been offended by an empolyeed. You are a friend of the manager; please recommend some books about internal communication to help your friend learn to communicate appropriately.

1.2

Emma is preparing for the certificate examination of stock analyst. Something like answers of past exams or statute are all needed, rather than information like exam brochure. Would you please recommend three books to Emma?

1.3

The economic is booming these days, Joyce, who just graduated from university, wants to seize this opportunity to earn some money by investment. Since she is only the beginner of financial investment, in case she loses all her money, she needs some reference book about investment. Please recommend three books to Joyce.

2. Hedonic scenarios

2.1

Emily plans to travel around the Europe during summer time by herself. This is the first time for her going abroad. German, Czech, and Austria are countries where she wants to visit. She is interested in information about travel planning and culture understanding. Please recommend three books concerning reveal preparing and planning to Emily.

2.2

Judy likes decorating her room. She plans to move into a new house in few weeks, but still considering how to set her new room. Please recommend three books about room setting to Judy.

2.3.

Henin is interested in Photoshop software recently. She wants to edit some photos by using the software, but still cannot use it well. Please recommend three professional books which could add various effects on photos to Henin.

# A Quantitative Comparison on Online Encyclopedias - A Case Study of Wikipedia and Knol

**Hsin-Yi Wu, Kuang-Hua Chen**
Department of Library and Information Science
National Taiwan University, Taiwan.
{E-mail: qoo.pikachu@gmail.com; khchen@ntu.edu.tw}

**ABSTRACT**

The study attempts to use a quantitative approach to compare two kinds of online encyclopedias, that is, folk-oriented Wikipedia and expert-oriented Knol. Based on two main sampling rules, 20 topics were chosen from each encyclopedia. The comparison is based on six indices - page views per year, text words, readability, page strength, citation numbers, and citation types. All the data for calculating six indices are collected from online encyclopedias' websites, document analyses and tools of websites. Eight health related topics out of 20 topics are examined in this preliminary study and Wilcoxon's rank sum test is used to determine statistical significance. The results show that five out of six indices are of statistical significance at level of 0.05. The suggestions to Wikipedia and Knol are also presented. The initial findings may benefit the related researches in the future.

## INTRODUCTION

When Internet starts to flourish, a great deal of data and information is created by various persons from all over the world. Too much information results in an increasing necessity of well-organized information. In this circumstance, online encyclopedias are created accordingly, e.g., Wikipedia, Knol, Citizendium and Scholarpedia. Among these valuable resources, Wikipedia receives the most attention. The reason is that experts, laymen, and even the average Internet users can make their own edits. Since Wikipedia has been regarded as one of the well-known and accessible resources, any controversial content will have influences on the Internet uses. For example, an article of Wikipedia had incorrectly linked former journalist John Seigenthaler to the assassination of Robert Kennedy and John F. Kennedy. Another example is the former MTV VJ and pod casting pioneer Adam Curry was accused of omitting Wikipedia's References to Kevin Marks, another early pod casting luminary (Terdiman, 2005). The credibility of Wikipedia has been called into question since these controversies events have happened, researchers and teachers began to question the quality, accuracy and credibility of Wikipedia. Some schools in America even ban students to cite Wikipedia.

In order to improve quality and avoid controversy, similar efforts such as Knol, Citizendium and Scholarpedia that emphasize the role of expert editors have emerged. For instance, Scholarpedia invites experts to write and review articles. Citizendium also welcomes experts and the public to write articles, but articles have to be reviewed by experts. Knol is a blog-type encyclopedia paying attention to the background of authors. After surveying online encyclopedias, this study attempts to use a quantitative approach to investigate present status of Wikipedia and Knol; namely, to explore differences between folk-oriented and expert-oriented encyclopedias. The main reason we choose Knol out of

Citizendium and Scholarpedia as the research subject is that it has accumulated more than 100,000 articles and extensively covers various topics which are appropriately compared with Wikipedia.

According to the online encyclopedias' websites, document analyses, and tools of websites, this study develops six indices to compare 20 topics sampled from two main sampling rules. The Wilcoxon's rank sum test has been applied to analyze the significance of page views per year, text words, readability, page strength, citation numbers, and citation types. To summarize, this study aims to investigate differences between Wikipedia and Knol, and the results will deep our understanding of the folk-oriented and the expert-oriented encyclopedias.

## RESEARCH DESIGN

The previous studies usually use two kinds of research designs. One is calculating how much time of the Wikipedia community needs to fix the errors. (Halavais, 2004; Viégas, Wattenberg, & Dave, 2004; Magnus, 2008; Tynan, 2008) The other is qualitative assessment by experts, like the expert-led investigation carried out by Nature - the first to adopt peer review to compare Wikipedia and Britannica's by counting errors of each encyclopedia, (Giles, 2005) however, after relative researches mode Nature' study. (Giles, 2005; Rosenzweig, 2006; Reading, Guyer, Leadingham, & Sharif, 2008; Rector, 2008) In view of above research designs and indices (time and correctness) lack of variability, this study tries to compare Wikipedia and Knol from a different viewpoint - a quantitative approach, and programs the following research design.

The steps involved in this study are shown in Figure 1. The three crucial designs are choosing subjects of the study, setting up two main sampling rules, and developing six indices. The researcher surveys the famous online encyclopedias, Wikipedia, Knol, Citizendium, and Scholarpedia and chooses research subjects to compare different characteristics. Totally 21 different characteristics consist of the follow-up research. They are time of creation, years, creator, meaning of encyclopedias' name, language, classification, community, articles numbers, character of community, account system, information quality assurance agent manage, management, character of articles, edit mode, cooperation model, copyright, work coordination artifact, content quality evaluation and selection process, high quality articles review and removal processes, high quality articles status assignment processes, and revenue model.

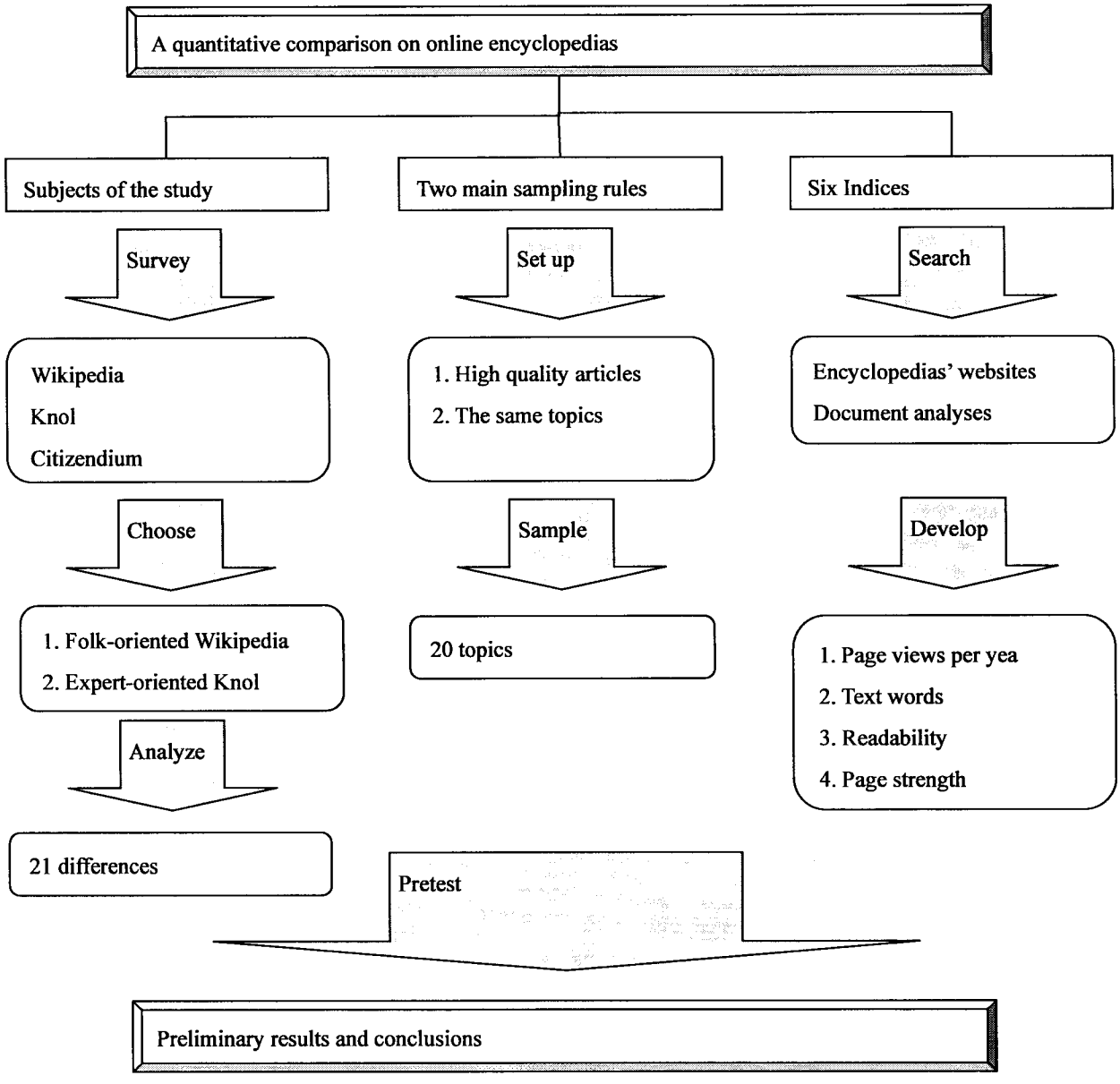


**Figure 1: Research process**

The study has set up two main sampling rules to select topics. Rule 1 is choosing the high quality articles in each encyclopedia. In Wikipedia, the high quality article is so-called "featured article", which need to pass the featured article criteria, are finally decided by the community consensus. (Wikipedia, n.d.) In Knol, that is called "top picks article" selected by an algorithm, such as page views, article rating and reviews. (Knol, n.d.) Rule 2 is sampling articles from both websites that address the same topics for comparison's purpose. Original sampling design is to sample at least 1 article based on each of 12 popular categories of Knol, which are society, business, regional content, Internet, music, shopping, health, entertainment, industries, science, reference and education. However, the researcher is unable to sample at least 1 article for each category due to few similar articles, so the sampling result is not the same as expected.

This research also applies six indices which are page views per year, text words, readability, page strength, citation numbers, and citation types as listed in Table 1. Page views per year collected from the online encyclopedias' websites. It represents the popularity of topics and it is the total article page views divided by the age of article. The uses of text

words, readability, citation numbers and citation types have been discussed in literature. (Nielsen, 2007; Rector, 2008; Song & Jeng, 2009) Text words calculate the total words except reference and further reading sections. Readability is used to examine whether textbooks are appropriate for students to read (Song & Jeng, 2009) and also is used to evaluate blogs, pages, etc. in many other researches. The readability test tool takes the text on web page and gives a score for the most used readability indicators including Gunning-Fog Score, Flesch Kincaid Reading Ease, Flesch Kincaid Grade Level, SMOG Index, Coleman Liau Index, and Automated Readability Index as listed in Table 2. (Read-able.com, n.d.) Citation numbers calculates the total number of References, which usually appear at the end of the article. Citation types consist of three different References types, and the researcher will calculate the percentage of each type and then use JCR Web (n.d.), LibraryThing (n.d.) and Trifecta (n.d.) to collect data of all kinds of journals, books, and web pages respectively.

**Table 1. The excerpts of 6 indices**

| Indices | Sources | Description |
|---|---|---|
| Page views per year | Online encyclopedias' websites | Total article page views divided by the age of article |
| Text words | Document analysis | Total words except reference and further reading sections |
| Readability | *Document analysis | Gunning-Fog Score<br>Flesch Kincaid Reading Ease<br>Flesch Kincaid Grade Level<br>SMOG Index<br>Coleman Liau Index<br>Automated Readability Index |
| Page strength | *Tools of websites | Ranking at Google for 1st 4 words in title tag<br>Page rank of homepage, page rank of page<br>Google URL mentions<br>Google blog search links to page<br>Yahoo site explorer links to domain<br>Yahoo site explorer links to page |
| Citation numbers | Document analysis | Total number of References |
| Citation types | Document analysis | Journals, Books, Web pages |

**NOTE: *: THE WEBSITE DOES NOT SPECIFY THE FORMULA.**

**Table 2. 6 Readability indicators**

| Readability | Formula |
|---|---|
| Gunning-Fog Score | Grade = 0.4 x {ASL + 100 x (CW/words)} |
| Flesch Kincaid Reading Ease | 0 to 100 = 206.835 - (1.015 x ASL) - (84.6 x ASW)<br>The higher the number, the easier the text is to read. |
| Flesch Kincaid Grade Level | Grade = (0.39 x ASL) + (11.8 x ASW) - 15.59 |
| SMOG Index | Grade = 3.1291 + 1.0430 x ($\sqrt{CW/sentences}$) |
| Coleman Liau Index | Grade = 5.89 × (characters/words) - 0.3 × (sentences/words) - 15.8 |
| Automated Readability Index | Grade = 4.71 × (characters/words) + 0.5 × (words/sentences) - 21.43 |

**Note: ASL: Average sentence length (i.e., the number of words divided by the number of sentences); ASW: Average number of syllables per word (i.e., the number of syllables divided by the number of words); CW: Three or more syllables words.**

Besides aforementioned indices, Trifecta can measure the popularity, influence and ranking ability of pages, blogs and entire domains in the World Wide Web through the results of ranking at Google for 1st 4 words in title tag, page rank of homepage, page rank of web page, Google URL mentions, Google blog search links to page, Yahoo site explorer links to domain, and Yahoo site explorer links to page (SEOmoz, n.d.). Each topic will have six grades, and the Wilcoxon's rank sum test is used to find whether the six indices are statistically significant at level of 0.05. The pretest and its preliminary results will be described in the next section.

## PRELIMINARY RESULTS

Based on the 2 main sampling rules, this study totally samples 20 topics, including Alzheimer's disease, autism, Helicobacter pylori, influenza, lung cancer, multiple sclerosis, subarachnoid hemorrhage, tuberculosis, Alfred Russel Wallace, Archaeopteryx, galaxy, global warming, Hubble Space Telescope, Australia, Canada, India, Israel, film noir, Islam and search engine optimization. According to the classification in Wikipedia and Knol, these topics are divided into 8 and 6 categories respectively. In Wikipedia, those are health and medicine, biology, physics and astronomy, geology, geophysics and meteorology, geography and places, media, religion, mysticism and mythology and computing. In Knol, those are health, science, regional content, entertainment, religion and internet. The pretest samples 8 health related topics, Alzheimer's disease, autism, Helicobacter pylori, influenza, lung cancer, multiple sclerosis, subarachnoid hemorrhage and tuberculosis.

The research can obtain the values for page views per year, text words, readability, page strength, citation numbers and citation types using the resources discussed in previous section. SPSS is used to carry out the Wilcoxon's rank sum test for these grades and finds that five indices are statistically significant at level of 0.05. The results for six indices and their pretest values are listed in Table 3. The asterisk denotes the values are statistically significant.

**Table 3. The preliminary results**

| | Page views per year | Text words | Readability | Page strength | Citation numbers | Citation types(J) |
|---|---|---|---|---|---|---|
| Z | -2.521[a] | -.980[a] | -1.980[b] | -2.527[a] | -2.524[a] | -2.032[b] |
| Asymp. Sig. (2-tailed) | .012* | .327 | .048* | .012* | .012* | .042* |
| Average of Wikipedia | 145264.120 | 7347.000 | 8.500 | 0.629 | 141.000 | 8.602 |
| Average of Knol | 10144.500 | 6130.625 | 9.875 | 0.243 | 17.000 | 12.372 |

**Note: *: denotes significance; a: based on positive rank; b: based on negative rank; J: all kinds of journals**

There is no difference in text words but the other 5 indices show significantly different. In page views per year, page strength and citation numbers, the average values of Wikipedia are higher than Knol. In readability and citation types of journals, the average values of Knol are higher than those of Wikipedia. It is interesting to observe that each online encyclopedia possesses its own features. In other words, folk-oriented Wikipedia has the characteristics of popularity, influence, ranking ability, and also offers a large number of reference resources. Expert-oriented Knol provides more difficult articles and cites more authority resources. To improve Wikipedia, it needs to control citation numbers and cites more authority resources to increase accuracy and credibility. For Knol, it needs to do search engine optimization. Besides, according to the National Adult Literacy Survey (NALS), approximately 21 percent of the adult population in the United States have low literacy skills, defined as reading at the 6 grade level or below, while another 27 percent may have limited literacy ability, defined as lacking general reading and numeric proficiency to function adequately in society (Shalowitz & Wolf, 2004), so not only Wikipedia but also Knol need to increase its readability to fit much more general readers.

## CONCLUSIONS

This study reports preliminary results on the differences between folk-oriented and expert-oriented online encyclopedias. We used Wilcoxon's rank sum test to examine the pretest 8 health related topics. Five out of six indices

show significant differences between Wikipedia and Knol. Those are page views per year, readability, page strength, citation numbers and journal in citation types. As there are differences in 5 indices, the initial findings may benefit the future related research. Furthermore, the result can help online encyclopedias improve their quality from different viewpoints. In addition, users could choose appropriate articles from different valuable resources based on our investigations. However, the study is unable to sample at least 1 article for each category of Knol and the comparisons among Wikipedia, Citizendium, and Scholarpedia are not carried out due to the same reason, either. The researchers have to conduct further studies with consideration of these shortcomings.

## REFERENCES


Bragues, G. (2009). Wiki-philosophizing in a marketplace of ideas: Evaluating Wikipedia's entries on seven great minds. *MediaTropes, 2*(1), 117–158.

Giles, J. (2005). Internet encyclopaedias go head to head. *Nature, 438*, 900-901. Retrieved February 22, 2010, from http://www.nature.com/nature/journal/v438/n7070/full/438900a.html

Magnus, P. D. (2006). Epistemology and the Wikipedia. Presented at the North American Computing and Philosophy Conference in Troy, New York. Retrieved February 22, 2010, from http://www.fecundity.com/job/wikipedia.pdf

Nielsen, F. (2007). Scientific citations in Wikipedia. *First Monday, 12*. Retrieved May 27, 2010, from http://131.193.153.231/www/issues/issue12_8/nielsen/

Viégas, F. B.,Wattenberg, M., & Dave, K. (2004). Studying cooperation and conflict between authors with history flow visualizations. *CHI 2004, 6*(1), 575-582. Retrieved October 22, 2009, from http://www.research.ibm.com

Reading, N., Guyer, A., Leadingham, S., & Sharif, S. (2008). How does Wikipedia measure up?. *The Quill (Chicago, Ill.), 96*(9), 16-19

Rector, L. (2008). Comparison of Wikipedia and other encyclopedias for accuracy, breadth, and depth in historical articles. *Reference Services Review, 36*, 7-22.

Rosenzweig, R. (2006). Can history be open source? Wikipedia and the future of the past. *Journal of American History, 93*(1), 117-146.

Shalowitz, D. I. and Wolf, M. S. (2004). Shared decision-making and the lower literate patient. *Journal of law, medicine & ethics*, 32, 759-64.

Song, P.-J. and Jeng, C.-C. (2009). Research on and application of readability of approved elementary school English textbooks in Taiwan. *Journal of Textbook Research, 2*, 55-80. (in Chinese)

Terdiman, D. (2005). *Wikipedia vs Encyclopaedia Britannica.* Retrieved August 16, 2010, from http://www.silicon.com/technology/networks/2005/12/16/wikipedia-vs-encyclopaedia-britannica-39155109/

Knol (n.d.) Knol. Retrieved August 16, 2010, from http://knol.google.com/

LibraryThing (n.d.) *LibraryThing*. Retrieved August 16, 2010, from http://www.librarything.com/

Wikipedia (n.d.) *Wikipedia*. Retrieved August 16, 2010, from http://www.wikipedia.org/

JCR Web (n.d.) *Journal Citation Report*. Retrieved August 16, 2010, from http://isiknowledge.com/jcr

Read-able.com (n.d.) The Readability Test Tool. Retrieved Oct. 4, 2010, from http://read-able.com/.

SEOmoz (n.d.) *Trifecta*. Retrieved Oct. 4, 2010, from http://www.seomoz.org/trifecta

# An Interactive Quiz-based Approach for Inferring Users' Movie Preference

**I-Chin Wu, Wei-Hao Hwang, Kuan-Yu King, and Meng-Yi Lin**
Department of Information Management
Fu Jen Catholic University, Taiwan
{E-mail: icwu.fju@gmail.com}

**ABSTRACT**

Generally, recommender systems predict users' pReferences based on the user's search behavior on the Web sites and recommend items that may be of interest. Collaborative filtering techniques are also widely used by e-commerce sites to provide recommendations to customers based on the pReferences of similar users. However, as the numbers of customers and products increase, the prediction accuracy of collaborative filtering algorithms declines because of sparse ratings. To tackle the problem, we propose an interactive quiz-based approach to elicit users' movie preference naturally during the web interaction process. Specifically, we employ a fuzzy inference method to mitigate the problem of sparse ratings. The proposed framework enhanced with the sources and methods of eliciting users' movie pReferences to model users' interests explicitly and implicitly and provide effective movie recommendations.

**INTRODUCTION**

Personalized recommendation systems, which provide users with one-to-one guidance, have become very important in electronic commerce. Various methods for learning users' interests or pReferences from text documents or web pages have been proposed for real-world applications based on recommender systems; for example, adaptive web page recommendation services (Balabanovi'c & Shoham, 1997; White et al., 2009), personalized online newspapers (Pazzani & Billsus, 1997), movie recommendations (Dahlen et al., 1998) and joke recommendations (Gupta et al., 1999). These approaches rely on learning algorithms that modify users' profiles to reflect the users' interests or pReferences.

Various kinds of information filtering approaches have been proposed to predict uses' pReferences. Generally, they can be classified as content-based filtering or collaborative filtering approaches. The latter, which are widely used in a large number of diverse applications (Adomavicius, & Tuzhilin, 2005; Goldberg et al., 1992), enable web sites to recommend products based on the pReferences of peer groups whose interests are similar to those of the target users. GroupLens (Konstan et al., 1997) and MovieLens (Dahlen et al., 1998) are two well known collaborative recommender systems that recommend news and movies respectively. The GroupLens project applies a personalized collaborative filtering technique to Usenet news, a high-volume, high-noise set of discussion groups distributed across the Internet. Under the MovieLens system, users provide ratings of movies they have seen. Then, the system employs a collaborative filtering algorithm to recommend movies that similar users liked.

Although collaborative filtering is a promising way to expand the user's profile of interests, it cannot overcome the problem of sparse ratings (an individual can only vote for a small fraction of all items). The problem is usually resolved

by employing hybrid methods, i.e., by combining content-based and a collaborative filtering techniques (Adomavicius, & Tuzhilin, 2005; Balabanovi'c & Shoham, 1997; Burke, 2002). Clearly, an effective recommendation system must be able to model users' pReferences for items explicitly or implicitly. Recently, some researchers have shown that a user's pReferences are correlated with his/her personality and prior knowledge (Hu & Pu, 2009; Rentfrow & Gosling, 2003). Hu & Pu (2009) proposed a personality-based system and demonstrated that users prefer quiz-based recommender systems rather than traditional rating-based recommender systems. Whattorent.com is an example of an application that makes recommendations based on information about the user's personality and mood. Accordingly, we propose an interactive quiz-based method to capture users' movie pReferences more naturally. We also use a fuzzy inference method that estimates the unknown values in a spare matrix and decides appropriate neighborhoods by applying an $\alpha$-cut operation. Based on the proposed approach, we develop a recommendation system, called IQ-Movie, to elicit users' movie pReferences.

## THE SYSTEM FRAMEWORK

The proposed IQ-Movie system comprised of four modules, as shown in Figure 1.

**User feedback collection module**: This module captures users' on-line search behavior related to movies. Each user's explicit ratings for movies and quizzed-based interaction scores are captured and recorded by the system simultaneously. A log-parsing engine in the user behavior tracking module analyzes the log-files that track the user's interaction with the system.

**Movie preference modeling and inference modules:** These modules model the user's movie pReferences from the two sources of information recorded by the system: (*i*) the ratings, and (ii) the quiz-based interaction scores. Then, each user's pReferences are expressed as a user profile and represented as a record <user_id, movie_id, rating, quiz_score >. To resolve the sparse matrix problem, we adopt a fuzzy inference method to infer the implicit and transitive relationships among users.

**Recommendation module:** This module matches a user's profile with the database to streamline the movie recommendation process. The system can revise the list of recommended movies immediately, based on the interactive results of the picture-based quizzes, as shown in Figure 2.

Next, we describe the proposed IQ-Movie system in detail.

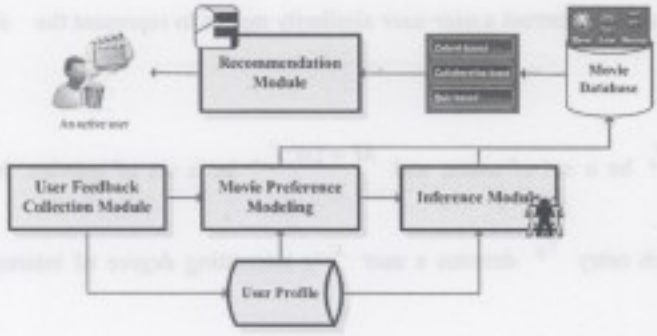


**Figure 1: The IQ-Movie system framework**

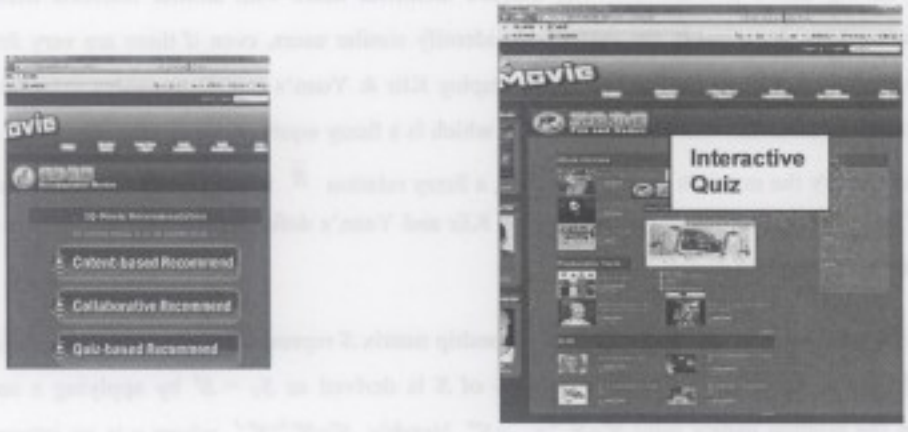


**Figure 2: The interactive quiz-based movie recommendation mode**

## MOVIE PREFERENCE MODELING AND THE RECOMMENDATION PROCESS

### User Feedback Tracking and Preference Modeling

There are two sources of information about users' movie pReferences, i.e,, ratings and quiz-based interaction scores. First, a user's level of interest in a movie, $id(m_j)$ is derived based on his/her feedback recorded in the system, as shown in Eq.(1). Then, a profile is constructed to represent the user's movie pReferences.

$$id(m_j) = \lambda \times R(m_j) + (1-\lambda) \times IQ(m_j), \quad (1)$$

where $R(m_j)$ denotes the user's rating for a specific movie $m_j$, and the $IQ(m_j)$ is the user's interactive quiz score. In the system, the ratings are divided into 6 levels: 0, 0.2, 0.4, 0.6, 0.8 and 1; and the score is normalized in the range 0 to 1. The parameter $\lambda$ is used to adjust the relative importance of ratings and scores.

*Inferring User PReferences*

We employ a fuzzy inference method to identify users with similar movie interests based on the results of preference modeling. The method involves two steps.

**Step One:** A *user-movie* relation matrix is constructed according to *Definition 1*. Then, we calculate the similarity among

users by the *cosine measure* and construct a *user-user* similarity matrix to represent the similarity relationships between users' movie interests.

*Definition I*: Let $X=\{x_i\}_{i=1}^{N}$ be a set of users, and $M=\{m_j\}_{j=1}^{l}$ be a set of movies. In addition, let $V=\{v_{ij}\}_{ij}$ be a user-movie matrix in which entry $v_{ij}$ denotes a user $x_i$'s interesting degree of interest in a movie $m_j$, derived by Eq.(1).

**Step Two:** To resolve the sparse matrix problem, a fuzzy inference method is used to infer the implicit and transitive relationships among user's pReferences. The method identifies users with similar interests based on their inherent transitive relationships. As a result, the system can identify similar users, even if there are very few explicit similarity scores in the similarity relationship matrix *S*. We employ Klir & Yuan's (1995) transitive max–min closure method to derive a reflective, symmetric, and transitive matrix, which is a fuzzy equivalence matrix. The fuzzy equivalence relation can be used to classify the matrix's outputs. Notably, a fuzzy relation $\widetilde{R}$ is a fuzzy equivalence relation if it satisfies the properties of reflexivity, symmetry, and transitivity. Klir and Yuan's definition of a transitive max–min closure $\boldsymbol{S_T}$ in a similarity matrix $\boldsymbol{S}$ is given in *Definition II*.

*Definition II*: Given an *n*-by-*n* fuzzy similarity relationship matrix $\boldsymbol{S}$ representing the fuzzy relations among a set of users $\boldsymbol{X}$, where $|X| = n$, *a* transitive max-min closure $\boldsymbol{S_T}$ of $\boldsymbol{S}$ is derived as $\boldsymbol{S_T} = \boldsymbol{S}^y$ by applying a sequence of max-min operations on the relation matrix until $\boldsymbol{S}^y=\boldsymbol{S}^{y+1}=\ldots=\boldsymbol{S}^{\infty}$. Notably, $\boldsymbol{S}^y=\boldsymbol{S}^{y-1}\circ\boldsymbol{S}^{y-1}$, where $y$ is an integer, $1\le y \le n$-1 and $\circ$ denotes a fuzzy max-min operation. The max-min composition and max operator for set unions are used to derive the transitive max-min closure $\boldsymbol{S_T}$. The fuzzy max-min operation is defined as follows:

$$\tilde{\varsigma}^{y}(x_i,x_j) = \max_{E_u\in X} \min(\tilde{\varsigma}^{y-1}(x_i,x_u),\tilde{\varsigma}^{y-1}(x_u,x_j)), \quad (2)$$

where $\tilde{\varsigma}^{y}(x_i,x_j)$ represents an element in $\boldsymbol{S}^y$ and $\tilde{\varsigma}^{y-1}(x_i,x_u)/\tilde{\varsigma}^{y-1}(x_u,x_j)$ represents an element in $\boldsymbol{S}^{y-1}$.

**Example 1:** If $\tilde{\varsigma}^{y}(x_1,x_2)=0.7$ and $\tilde{\varsigma}^{y}(x_2,x_3)=0.4$, but $\tilde{\varsigma}^{y}(x_1,x_3)=0.0\le\min(0.7,0.4)$, the fuzzy transitive property is not be satisfied. Thus, the above similarity relation $S$ does not satisfy the fuzzy transitivity property because $S$ is not a fuzzy equivalence relation. After two more compositions, the fuzzy transitive relation $S^3=S\circ S\circ S$ is obtained and all three conditions of the fuzzy equivalence relation are satisfied, as shown in Figure 3.

$$S^2=S\circ S=\begin{bmatrix}1&0.7&0.4&0.2&0.7\\0.7&1&0.4&0.5&0.8\\0.4&0.4&1&0&0.4\\0.2&0.5&0&1&0.5\\0.7&0.8&0.4&0.5&1\end{bmatrix}\quad S^3=S\circ S\circ S=\begin{bmatrix}1&0.7&0.4&0.5&0.7\\0.7&1&0.4&0.5&0.8\\0.4&0.4&1&0.4&0.4\\0.5&0.5&0.4&1&0.5\\0.7&0.8&0.4&0.5&1\end{bmatrix}$$

**Figure 3:Inferring pReferences based on the users' similarity relation**

$$R_{0.7}=\begin{bmatrix}1&1&0&0&1\\1&1&0&0&1\\0&0&1&0&0\\0&0&0&1&0\\1&1&0&0&1\end{bmatrix}\quad R_{0.5}=\begin{bmatrix}1&1&0&1&1\\1&1&0&1&1\\0&0&1&0&0\\1&1&0&1&1\\1&1&0&1&1\end{bmatrix}$$

**Figure 4: Selection of groups with similar interests based on the α-cut values**

## SELECTION OF GROUPS WITH SIMILAR INTERESTS

The α-cut operation is then applied to generate a proper set of neighborhoods. The α-cuts can be applied to the equivalence matrix $S_T$ for any a degree of interest to group users in $X$ where $\alpha \in (0,1)$. Different subsets of equivalence relations are derived by setting different α degrees in the matrix $S_T$ to partition set $X$. One way to improve the recommendation quality is to provide collaborative recommendations based on a group of users who have similar movie pReferences. A standard (non-fuzzy or crisp) equivalence relation $S_\alpha$ can be obtained from a fuzzy equivalence relation, say $S_e$, by applying an α-cut operation on the fuzzy relation $S_e$. The crisp relation $S_\alpha$ is defined as $S_\alpha = \{(i,j) \mid x_s(i,j) \geq \alpha\}$.

**Example 2:** If the strength of the relation between $i$ and $j$ is greater than or equal to α, it is set at 1; and 0 otherwise. The outputs are classified based on the values of α. For example, if we set α=0.7, the crisp equivalence relation matrix is as shown in Figure 4. We can identify three groups in the matrix, i.e., $\{\{x_1, x_2, x_5\}, \{x_3\}, \{x_4\}\}$. However, if we set α=0.5, we can identify two groups and the crisp equivalence relation becomes $\{\{x_1, x_2, x_4, x_5\}, \{x_3\}\}$, as shown in Figure 4.

Finally, we adopt *Pearson correlation coefficient* to calculate the similarity among users. Accordingly, the predictive value of an active user for a movie is computed as weighted sum of highest similarity users' ratings.

## CONCLUSION AND FUTURE WORKS

An effective recommendation system must be able to model users' pReferences for items both explicitly or implicitly. Since the mid-1990s, a great deal of research has focused on how to derive sufficient numbers of explicit ratings to construct users' profiles, which are then used to predict the users' pReferences (Konstan et al., 1997; Schafer, et al., 2000). However, some recent research results have shown that an individual's pReferences are correlated with his/her personality and prior knowledge (Hu & Pu, 2009; Rentfrow & Gosling, 2003). In this work, we propose a novel interactive quiz-based approach to determine a user's prior knowledge about movies more naturally and then infer his/her movie pReferences. We also employ a fuzzy inference approach to mitigate the sparse matrix problem. Finally, an IQ-Movie system is developed based on the proposed approach. In our future work, we will compare the performance of the proposed approach with that of traditional content-based and collaborative filtering approaches.

## ACKNOWLEDGEMENT

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## REFERENCES

Adomavicius, G., & Tuzhilin, A. (2005). Toward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions. *IEEE Transactions on Knowledge and Data Engineering*, 17(6), 734-749.

Balabanovic, M., & Shoham, Y. (1997). Fab: content-based, collaborative recommendation. *Communications of the ACM, 40*(3), 66–72.

Burke, R. (2002). Hybrid recommender systems: Survey and experiments. *User Modeling and User-Adapted Interaction*, 12(4), 331-370.

Dahlen, B.J., Konstan, J.A., Herlocker, J.L., Good, N., Borchers, A., Riedl, J. (1998). Jump-starting MovieLens: User benefits of starting a collaborative filtering system with "dead data". *University of Minnesota, Technical Report,*

98-017.

Goldberg, D., Nichols, D., Oki, B.M., & Terry, D.. (1992). Using collaborative filtering to weave an information tapestry. *Communications of the ACM*, 35(12), 61-70.

Gupta, D., Digiovanni, M., Narita, H., & Goldberg, K. (1999). Jester 2.0: A new linear-time collaborative filtering algorithm applied to jokes. *In Workshop on Recommender Systems at (ACM SIGIR '99)*.

Hu, R., & Pu, P. (2009). A comparative user study on rating vs. personality quiz based preference elicitation Methods, *Proceedings of the 13th International Conference on Intelligent User Interfaces (IUI '09)*, (pp. 367-372).

Klir, G.J., & Yuan, B. (Ed.) (1995). Fuzzy sets and fuzzy logic: Theory and applications, Upper Saddle River, NJ: Prentice Hall.

Konstan, J., Miller, B., & Maltz, D., & Herlocker, J., & Gordon, L., & Riedl, J. (1997). GroupLens: Applying collaborative filtering to Usenet news, *Communications of the ACM*, 40(3), 77-87.

Pazzani, M., & Billsus, D. (1997). Learning and revising user profiles: The Identification of Interesting Web sites, *Machine Learning*, 27, 313–331.

Rentfrow, P.J., & Gosling, S.D. (2003). The do re mi's of everyday life: The structure and personality correlates of music pReferences. *Journal of Personality and Social Psychology*, 84, 1236-1256.

Schafer, J.B., Konstan, J., & Riedl, J. (2000), E-Commerce recommendation application, *Journal of Data Mining and Knowledge Discovery*, 5(1/2), 115-152.

White, R.W., Bailey, P., & Chen, L. (2009). Predicting user interests from contextual information, Proceedings of the 32nd international ACM SIGIR Conference on Research and Development in Information Retrieval (ACM SIGIR 09'), (pp. 363-370).

# A Library Learning Commons Like a Food Court

**Ti Yu**
Associate Professor
Department of Applied English
Jinwen University of Science and Technology, Taiwan
Doctoral Student, Graduate Institute of Library & Information Studies
National Taiwan Normal University, Taiwan
{E-mail: tiyu@just.edu.tw}

**ABSTRACT**

This study attempts to explore detailed definitions and descriptions of the learning commons based on the relevant literature as well as existing learning commons. In addition it tries to understand the perceptions of the students and to determine what is needed to establish a learning commons worth of the name. This study outlines a creative idea and preliminary plan for remodeling the e-Resource Learning Center in the JUST Library and makes it a state-of-the-art learning commons.

**INTRODUCTION**

Ever since the author attended the Annual Conference of University and College Librarians in Taiwan in May, 2010, the author has been hearing the term "learning commons". Several speakers have mentioned this new trend of the learning commons around university and college libraries. Although the term learning commons was unfamiliar to the author, its basic concept has been used in the library of Jinwen University of Science and Technology (JUST Library) for the past several years.

The old JUST Library building used to have an open computer lab with 80 workstations for students to do research for their assignments. Six years ago, JUST added a brand new 10225 sq ft "e-Resource Learning Center" on the 2nd floor of their new library building. This new facility contains 40 PC workstations for students to do their study as well as independently learn a new language. In addition there is a medium-sized audio/video room for students who want to watch movies in their leisure time. A fully-equipped classroom with 50 seats is also available for any e-learning course and is also used for the library instruction program.

These above-mentioned facilities of the JUST Library are similar to the concept of a learning commons, even if their functions are not as completed as those in a learning commons. This study attempts to explore detailed definitions and descriptions of the learning commons based on the relevant literature as well as existing learning commons. In addition it tries to understand the perceptions of the students and to determine what is needed to establish a learning commons worth of the name. This study outlines a creative idea and preliminary plan for remodeling the e-Resource Learning Center in the JUST Library and makes it a state-of-the-art learning commons.

## WHAT IS A LEARNING COMMONS?

Learning commons have been discussed in the literature since the creation of the Information Arcade in the University of Iowa in 1992. However, the concept of a learning commons seemed to have been initiated in Beagle's article entitled "Conceptualizing an Information Commons" in 1999 ( Franks and Tosko, 2007). Beagle (2004) stated that his article in 1999 offered a framework that has proven to be useful for many institutions, not only in describing the original path of an information commons, but also for the subsequent evolution and elaboration of the information commons into a learning commons model. Herman and Johnston (2007) simply stated that the learning commons is a "one stop shop" for learning support.

According to the experience of Canada's Dalhousie University, the learning commons was created to give their students a space where teamwork and discussion are welcomed and encouraged, where information is found easily, using a variety of the latest technology, and where technical support specialists are available to help students find the information they're looking for and to make the best use of the technology available to them (Nikkel, 2003). In the learning commons of the University of Akron, USA, students received the services of a highly skilled team of specialists, including librarians, professional staff, and peer helpers. All of them will assist students in learning to develop a topic, locate and retrieve information for their research, organize concepts for a paper or presentation, utilize course information on WebCT, and electronic reserves. This will maximize their learning from course readings and textbooks, and help them to develop effective study skills. It also provided various types of software and hardware including scanning and printing equipment to produce reports, visuals, charts, graphs, spreadsheets, and other research output ( Franks and Tosko, 2007). Since 2005, three libraries at the Victoria University of Australia have been transformed from self-contained libraries to become home to a group of partners offering key educational support services, including learning support, language support, careers and IT, etc. in a shared environment. The development of the library space at the Victoria University was driven by the concept of the learning commons as a central feature of the university's campus planning strategy (Kent and Gallagher, 2007).

In Taiwan in recent years, some university libraries also applied the concept of the learning commons to renovate their available spaces. For example, a SMILE E-learning Commons was established in the National Taiwan Normal University Library. It consists of three areas, a reference information area, a multimedia digital learning area, and a leisure rest area (洪世昌，2005). The National Chung Cheng University Library created a spacious ELITE Digital Activity Area. It provides readers with online resources, e-resources, language learning resources and a variety of equipment such as scanners, printers, and personal computers, etc. (謝佩君，2007)

The above-mentioned definitions of a learning commons and the practical experiences of some institutions across the global seem to indicate, a few essential functions that a learning commons should provide. For example, it should provide advisory services on obtaining information and the use of IT, including all the necessary equipment to finish a paper or assignment. In addition it should provide flexible space that is suitable for individual study or as a group leisurely, etc. Based on the above information, the six words that clearly describe the characteristics of the learning commons are "convenience", "diversification", "flexibility", informativeness", "leisurization", and "multifunction".

## RESEARCH METHOD

In order to create a brand-new learning commons in the JUST Library, this study reviewed the relevant literatures to understand the concept and develop the basis for establishing an ideal learning commons in the JUST Library for the students. In addition, a survey questionnaire was designed and used to investigate the perceptions of the students, and to determine the needs for a learning commons.

The questionnaire was divided into three parts. Part I, requested two items, their gender and which college they attended. Part II, lists 17 different kinds of software and hardware facilities are listed on the top of this section, including: (1) desk-top computer, (2) notebook computer, (3) projector and screen, (4) audio/video equipment, (5) whiteboard, (6) electronic whiteboard, (7) sound recording equipment, (8) scanner, (9) copy machine, (10) printer, (11) VOD (Video on Demand), (12) fax machine, (13) audio/ video editing software, (14) multimedia processing software (e.g. photo shop), (15) production software for e-learning material (e.g. course master), (16) statistical analysis software (e.g. SPSS), and (17) English editing software (e.g. Correct English). In addition, the questionnaire also listed and described nine different functions/facilities including: (1) small group study space, (2) multimedia production area, (3) audio/video station for individual viewing, (4) audio/ video area for group viewing, (5) library instruction classroom, (6) individual study space, (7) information retrieval service, (8) rest and leisure area, and (9) advisory services. A Likert-type scale ranging from 1 to 10 is used to measure the level of need among students for each function or facility. The higher the number the higher the level of need. The five "most needed" items were then required to be selected from the software and hardware list for each function/facility as mentioned above. Part III, listed six different advisory services regarding teaching and learning support including: (1) consulting on the use of e-learning platform, (2) consulting on the use of IT, (3) consulting on the producing of e-portfolio, (4) consulting on English and Japanese learning, (5) consulting on the English writing, and (6) consulting on the producing of e-learning material. The three most needed services had then to be selected from the list. In the end, students will be encouraged to add any comment or suggestion regarding facilities, functions, services and other ideas at the end of the questionnaire. The content of the questionnaire was pre-tested by 10 students at JUST, and then refined based on their responses and suggestions.

A small-scale investigation was conducted in first stage to collect some viewpoints from the students. Questionnaires were placed on the information desk of the e-Resource Learning Center from June 7th to 11$^{th}$ of 2010. Each student who visited the center during that period of time was invited to fill out the questionnaire on a voluntary basis before s/he left the center. In total, 136 students responded. The quantitative analysis of the questionnaire was conducted using SPSS (Statistical Package for Social Science) and the descriptive statistics method was used to analyze the data.

## INITIAL RESULTS

1. Characteristics of the responding students

Table 1 shows that the responding students included 43 male and 93 female students. Hospitality & Tourism Management College accounted for 17 percent, Business Management College accounted for 24 percent, Liberal Arts College accounted for 46 percent, and Electrical Engineering & Computer Science College accounted for 13 percent of the responding students.

**Table 1: Distribution of the respondents according to their characteristics**

| | *Characteristics* | *No. of responses* | *%* |
|---|---|---|---|
| Gender | male | 43 | 32 |
| | female | 93 | 68 |
| Academic college | Hospitality & Tourism Management | 23 | 17 |
| | Business Management | 33 | 24 |
| | Liberal Arts | 62 | 46 |
| | Electrical Engineering & Computer Science | 18 | 13 |

**Note: N=136**

2. Analysis of the functions needed for a learning commons, according to the students

Table 2 indicates that the five most needed functions according to the responding students, in order of significance were "small group study space" (Mean=6.61), "multimedia production area" (Mean=6.32), "audio/video station for individual viewing" (Mean=6.27), "audio/video area for group viewing" (Mean=6.21), and "information retrieval service" (M=6.21).

On the contrary, the function of "library instruction classroom" (Mean=5.34) showed to have the least significance. This result seems to imply that it may not be necessary to construct a physical and independent environment for library instruction. Actually, the implementation of library instruction can be everywhere and anytime depending on the individual needs.

**Table 2: Levels of need on different functions in a learning commons**

| *Functions* | *Mean* | *SD* |
|---|---|---|
| Small group study space | 6.61 | 2.178 |
| Multimedia production area | 6.32 | 2.150 |
| Audio/video station for individual viewing | 6.27 | 2.405 |
| Audio/video area for group viewing | 6.21 | 2.258 |
| Library instruction classroom | 5.34 | 2.281 |
| Individual study space | 6.11 | 2.499 |
| Information retrieval service | 6.21 | 2.323 |
| Rest and leisure area | 6.09 | 3.015 |
| Advisory services | 5.93 | 2.316 |

**Note: N=136**

3. Analysis of facilities and services needed to different functions among students

As shown in Table 3, no matter the function, a desk-top computer seems to be the most needed item by the responding students for any function. In addition, scanner, printer, and copy machine are also important support tools for them to study and do research individually or in a group. The projector and screen set also seems to be needed by students for the function of small group study and multimedia production. Table 3 also shows that software for multimedia productions are definitely needed in a learning commons. It is surprising that notebooks are

not needed as much as a desk-top computer. This might be due to the fact that most responding students already have their own personal notebook, or that most responding students get used to using a desk-top computer rather than a notebook.

With respect to advisory services, it shows that "consulting on English learning" is first, followed by "consulting on producing e-learning material" and "consulting on English writing". It is worth noting that close to 50% of the responding students show a strong need for assistance in their learning of English. Thus, providing essential advisory services regarding the four skills (reading, speaking, listening, and writing) in learning English is probably very important. However, the service of "consulting on the use of IT" showed a lower level of need (10% of responding students) compared to other types of advisory services, indicating that today's students have better IT background than those from years ago.

**Table 3: Needs for facilities and services on different functions**

| *Facilities/Services* | *1st priority* N(%) | *2nd priority* N(%) | *3rd priority* N(%) | *4th priority* N(%) | *5th priority* N(%) |
|---|---|---|---|---|---|
| Small group study space | desk-top computer 75(55) | printer 61(45) | scanner 59(43) | copy machine 56(41) | projector and screen 53(39) |
| Multimedia production area | multimedia processing software 57(42) | desk-top computer 52(38) | audio/video equipment 49(36) | audio/video editing software 47(35) | projector and screen 43(32) |
| Audio/video station for individual viewing | audio/video equipment 82(60) | projector and screen 54(40) | desk-top computer 50(37) | VOD 45(33) | notebook computer 31(23) |
| Audio/video area for group viewing | audio/video equipment 72(53) | projector and screen 63(46) | desk-top computer 36(26) | VOD 31(23) | notebook computer 24(18) |
| Library instruction classroom | projector and screen 51(38) | desk-top computer 48(35) | audio/video equipment 39(29) | electronic whiteboard 31(23) | Whiteboard 22(16) |
| Individual study space | desk-top computer 57(42) | scanner / printer 44(32) | copy machine 39(29) | audio/video equipment / multimedia processing software 28(21) | notebook computer 23(17) |
| Information retrieval service | desk-top computer 62(46) | printer 49(36) | copy machine 46(34) | scanner 34(25) | notebook computer 26(19) |
| Advisory services | language learning 63(46) | producing of e-learning material 61(45) | English writing 54(40) | producing of e-portfolio 47(35) | use of e-learning platform 41(30) |

**Note: 1.N=136**
**2."consulting on the use of IT" needed by 14(10%) responding students.**

4. Other suggestions

An open-ended question was designed to explore more comments and suggestions from the participants for establishing a learning commons. Some of the opinions proposed by several of the participants were as follows:

--I hope that the learning commons can provide video editing software.

--We need high-quality audio/video equipment.

--A large-sized table is needed to do an assignment individually or for a group meeting.

--I prefer software to hardware. I hope that more professional software related to my subject can be provided in the learning commons.

--Soundproofing is important for the audio/video area for both individual and group viewing .

--The e-Resource Learning Center is sometimes very noisy. It really bothers me.

--3D audio/video equipment is necessary.

--More comfortable chairs are needed in the learning commons.

It was found that students probably showed a demand for quality rather than quantity on both hardware and software according to their comments and suggestions. They do not only desire a basic level of facilities and furniture, but they also want it to be of a good quality. Obviously, the essential elements of a learning commons that will attract students probably will be high-end equipment, state-of-the-art products, comfortable furniture, and a cozy environment. Of course, it will definitely cost much time and money to build such kind of learning commons. Therefore, obtaining a confirmed generous budget is the first step to successfully establish a learning commons. In addition, a comfortable environment and well maintained and outstanding facilities are key points for the successful operation of a learning commons.

## CONCLUSION

Based on the above information of the relevant literature review and the result of the survey, this study proposed to build a food court style of learning commons in the JUST Library. As shown in Figure 1, the prototype of a learning commons is based on a pluralistic design, with a layout similar to that of a food court. Each function area is a shop. It allows students to shop around easily in such a layout. The information desk can be designed as a multifunctional service center which provides diverse advisory services for students and handle different requests from students. To make the space more flexible and convenient adjustable partitions and moveable furniture should be considered. Also based on the result of the survey, desk-top computers should be provided in the individual study space and small group study area. As to the scanners, printers and copiers, they probably can be installed in each individual study space area and small group study area. Finally, moveable cozy chairs and tables are needed for students in the rest and leisure areas. Do you think that a library learning commons can be built like a food court?

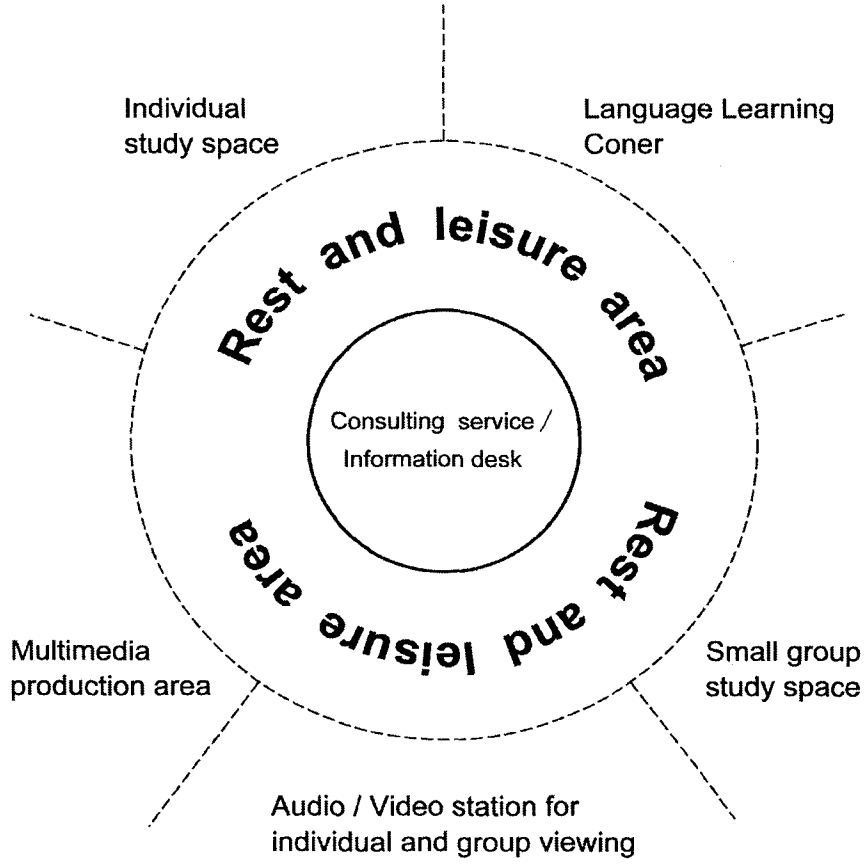


**Figure 1：Layout of a learning commons**

**REFERENCE**

Beagle, Donald (August 2004). From Information Commons to Learning Commons. Retrieved July 15, 2010, from http://www.usc.edu/libraries/locations/leavey/new_at_leavey/conference/presentations/presentations_9-16/Beagle_Information_Commons_to_Learning.pdf

Franks, Jeffery A. and Tosko, Michael P.(2007). Reference Librarians Speak for Users: A Learning Commons Concept That Meet the Needs of a Diverse Student Body. *The Reference Librarian,* 47(1), 105-118.

Harman, Elizabeth and Johnston, Belinda(2007). Learning in Contexts: Re-imaging Campuses and Partnerships at a New School of Thought. *Higher Education in the 21st Century Diversity of Missions Conference*. Dublin Institute of Technology, Dublin, June 25-27. Retrieved July 10, 2010, from http:www.vu.edu.au/home/Making_VU_a_New_School_of_Thought/index.aspx

Kent, Philip G. and Gallagher, Adrian(2007). Victoria University: Building the Learning Commons. *incite,* 28(11), 34.

Nikkel, Terry(2003). Implementing the Dalhousie Learning Commons. *Feliciter,* 4, 212-214.

洪世昌(2005)。SMILE數位學習共享空間」之理念與實踐。國立台灣師範大學圖書館館訊，69，4-8。

謝佩君(2007)。火線話題：E化服務又一樁 圖書館數位舒活區。中正E報(2007/04/25)，上網日期：2010年7月5日。網址： http://enews.ccu.edu.tw/modules/news/article.php?storyid=4228

# Information and Service Science

**Vilas Wuwongse**
School of Engineering and Technology
Asian Institute of Technology, Thailand
{E-mail: vilasw@ait.ac.th}

**Shigeo Sugimoto**
Graduate School of Library Information
and Media Studies
University of Tsukuba, Japan
{E-mail: sugimoto@slis.tsukuba.ac.jp}

**ABSTRACT**

*Information and Service Science* is proposed as a new field of study that bridges the gap between traditional library and information science (LIS) and iSchools. It is a combination of information science and service science. Information science is the core discipline of both LIS and iSchools. On the other hand, service science deals with the science, management, engineering and design of services as well as with the people. It aims at the improvement of service efficiency and the creation of service innovations. When applied to libraries, service science will broaden the discipline of library science as it will also treat the management, engineering and design of libraries and information. As a consequence, *information and service science* covers the most frequently used 5 keywords by both LIS and iSchools, namely, *information, library, services, systems and management*, and hence serves as a link between the two fields.

**INTRODUCTION**

Bonnici, Subramaniam and Burnett (2009) have carried out an exploratory study to determine whether the iSchools project (iSchools, n.d.) is a split, a conflict, or an ingestion of the traditional discipline of library and information science (LIS). Based on the theoretical framework developed by Abbot (2001), they have analyzed course names and descriptions, new faculty position announcements, postings to the Jesse listserve, content from iSchools website, and abstracts and papers from the 2006 and 2008 annual iSchools conferences. As a conclusion, they have found that the transformation from LIS to iSchools is a movement lying somewhere between the fractal differentiation and fractal cycle patterns. Fractal differentiation is the transformation in which a new subordinate generation, split from its previous main generation, repeats the fractal differentiation. For example, both library AND information science as a combined phrase is also mentioned in iSchools. In the fractal cycle pattern, concerns and ideas of the previous generations are re-conceptualized into a new generation. For example, there is no mention of *library* or there is a reference to library only in the past tense as historical roots of program (Bonnici, Subramaniam, & Burnett, 2009). The mechanism of progression in the fractal cycle pattern is normally from a generic field of study to a more specific one. However, the transformation from LIS to iSchools is from specific to broad over time. This progression pattern is evidenced from the website of the iSchools (iSchools, n.d.) which states that:

> The iSchools are interested in the relationship between information, people and technology. This is characterized by a commitment to learning and understanding the role of information in human endeavors. The iSchools take it as given that expertise in all forms of information is required for progress in science, business, education, and culture. This expertise must include understanding of the uses and users of information, as well as

information technologies and their applications.

and

Ph.D. graduates from the iSchools take faculty positions in diverse fields including Library and Information Science, Business, Communication, Management Information Systems, Public Affairs, Education, Computer Science, Law, Health Management and Informatics, and Information Studies. Graduates also work in corporations and non-profits.

The extent to which the iSchools field have been generalized is so broad that it has received a number of criticisms, e.g., a discipline without definable content, a branding exercise and a corporation of LIS (Jaeger, et al., 2010). As a response to these criticisms, one could define certain areas of specialization within the iSchools field while maintaining its interdisciplinary and multidisciplinary characteristics. This paper attempts to define such an area of specialization.

## COMMON KEYWORDS IN ISCHOOLS AND LIS

The largest enrollment base of iSchools is still generally the students who pursue library studies or who intend to work in libraries (Jaeger, et al., 2010). This enrollment pattern of iSchools might change in the future when the iSchools field could achieve its goal of being an academic field of study and a professional career field that deals with all the issues, opportunities, and challenges in the information age. Therefore a possible area of specialization of iSchools should be first something that is centered around LIS but goes much beyond its traditional boundary. In order to identify such an area of specialization, one could employ the common keywords between iSchools and LIS as a guideline.

Bonnici, Subramaniam and Burnett (2009) have found 5 top common keywords frequently used by iSchools and the LIS schools and departments in their course titles and course descriptions for master's level courses, i.e., *information, library, services, systems and management* (Table 1).

**Table 1. Word frequency rankings (adapted from Bonnici, Subramaniam & Burnett, 2009)**

| Word frequency ranking | iSchools | LIS schools/departments |
|---|---|---|
| 1 | information | information |
| 2 | library | library |
| 3 | systems | services |
| 4 | management | management |
| 5 | services | systems |

These 5 keywords can be divided into 2 groups: {information and systems} and {library, management and services}. The former group reflects the main content of the discipline of information science while the latter indicates the importance of the management and services of libraries. In other words, the common concern of iSchools and LIS schools/departments is information science and the management/services of libraries. Therefore, a field of study aiming to bridge or fill the gap between iSchools and LIS should cover information science and management/services of libraries. As the discipline of information science is commonly understood, this paper will focus on the discussion of the study of

the management and services of libraries.

## MANAGEMENT AND SERVICES OF LIBRARIES

In general, libraries provide 2 types of services: information and platform services (Figure 1). Information services are the services provided by the librarians in order to help information-seeking library users obtain their needed information or information sources. They include reference services, referral services, information search services, current awareness services as well as usage guidance. These information services are based on the traditional view that a library is a portal to printed and digital information. In recent years, it has, however, been recognized that libraries are not only about information but also about people. Libraries provide a place for people to use information as well as to learn and to participate in the life of a learning community. As a consequence, a library can be considered as a platform providing services that support people's learning and socialization. Examples of such services include "living books" and "learning commons". A "living book" is a person with a specialty in which a reader is interested. The reader can choose and borrow out a "living book" for a session of about a half hour. Unlike a book, the reader can ask questions and talk to a "living book." "Learning commons" is a set of services, resources and expertise that supports students in their learning, writing, research, numeracy and use of technology in collaborative settings. It is a platform that integrates the services of libraries, computing and communications, learning and teaching support.

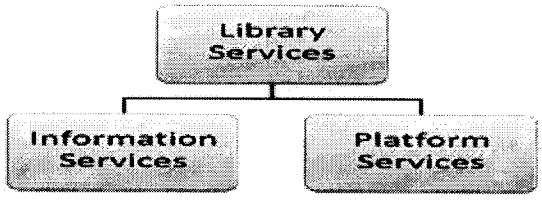


**Figure 1: Captions for figures should be below the figure**

With new concepts like living books and learning commons, the first decade of the 21st century has witnessed a number of innovations attempted by libraries worldwide. The innovations demand a lot of management skills from library directors and senior librarians. Where do the library directors and senior librarians receive their management skill training? To answer this question, Mackenzie and Smith (2009) have reviewed the curricula of 48 graduate library school programs accredited by the American Library Association and found that library managers are generally trained on the job. Of the 48 programs reviewed, 43.8% did not require management-related courses (Mackenzie & Smith, 2009). Since the main function of a library is to provide services, the management skills that library directors and the librarians who are in management positions should acquire are service management.

## LIBRARY SERVICE SCIENCE

The discipline that deals with services, as well as their management, science, engineering and design is called *service science* (Spohrer, et al., 2007). A service is generally defined as an act or a variety of work done for others in order to affect them in some desirable way. A service has 4 unique characteristics:

- Simultaneous: The production and the consumption of a service occur at the same time.
- Perishable: One can't store a service.

- Intangible: One can't see or touch a service.
- Heterogeneous: A service depends on its who (service provider), whom (service client), when and where.

Like other services, library services also share the 4 characteristics. For example, reference services are simultaneous. An enquiry for a reference and its response occur at the same time. The actions taken by the librarians at the reference desk of a library to serve the users cannot be stored or touched; hence they are perishable and intangible. Finally, they are heterogeneous as the details or the quality of work at a reference desk varies depending on the librarians in charge and the users. In short, library services are a kind of service.

Service science is a multidisciplinary field of study, integrating science, management, engineering, social science and humanities. It aims to improve the efficiency of services as well as to create service innovations. When applied to libraries, service science would therefore help enhance their service efficiency as well as service innovations, the subject matters that have never been considered seriously before in traditional library science. Particularly, platform services of libraries demand a lot of creativity, e.g., how to create an effective and efficient "living library" or "learning commons" under financial, cultural and other constraints.

A new area of specialization that applies the body of knowledge of service science to library services could be named *library service science*.

## INFORMATION AND SERVICE SCIENCE

Library service science combined with the technical and theoretical core of library science, i.e., information science leads to a new field of study: *information and service science*. This new field of study brings a generic concept of services to information. When information is approached from the service viewpoint, it is helpful to refer to the life cycle perspective of information resources. Figure 2 depicts a simple life cycle of information resources which consists of the creation, organization, utilization, selection and preservation of information resources. Services could be applied to all the steps in the life cycle to create values for the users. In addition, the understanding of the nature or science of information at each step would also help enhance its value creation.

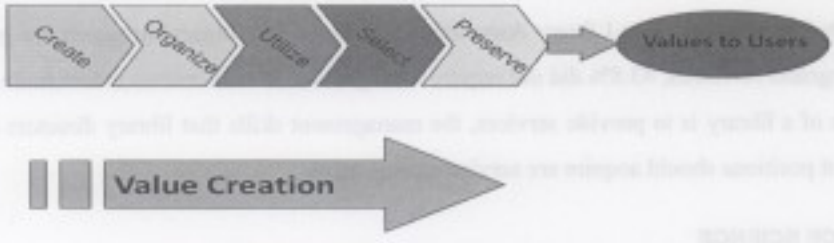


**Figure 2: Information resource life cycle**

An educational program in information and service science should contain 3 major components: common information and service science, information science and library service science courses. The first component will provide broad, fundamental knowledge in information science and service science; while the second and third components will give deep, specialized knowledge and skills in information science and library service science, respectively. With these 3 components, the trained students will be equipped with both broad and deep knowledge in information, library, services, systems and management, enabling them to make contributions in the value creation of the

information resource life cycle.

## CONCLUSION

Viewing library as a service, information and service science generalizes LIS. It deals with both platform and information services and covers all main services of conventional libraries such reference services, referral services, information search services and current awareness services. On the other hand, it specializes iSchools as it focuses on the science and services of information rather than all aspects of information as iSchools do. Hence, it serves as a link bridging the current gap between LIS and iSchools. As a new discipline, information and service science requires a further study on its curriculum and pedagogy; particularly, how it is going to serve the need for the education and training of library directors. The curriculum would be multi-disciplinary and demands contributions from experts across various fields of study. A consortium of educational institutes could be formed to develop and share such a curriculum.

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## REFERENCES

Abbot, A. (2001). The chaos of discipline. Chicago: University of Chicago Press.

Bonnici, L.J., Subramaniam, M.M., & Burnett, K. (2009). Everything old is new again: the evolution of library and information science education from LIS to iField. *Journal of Education for Library and Information Science*, 50, 263-274.

Jaeger, P.T., Golbeck, J., Druin, A., & Fleisschmann, K.R. (2010). The first workshop on the future of iSchool Doctoral education: issues, challenges, and aspirations. *Journal of Education for Library and Information Science*, 51, 201-208.

Mackenzie, M.L., & Smith, J.P. (2009). Management education for library directors: are graduate library programs providing future library directors with the skills and knowledge they will need? *Journal of Education for Library and Information Science*, 50, 129-142.

Spohrer, J., Maglio, P.P., Bailey, J., Gruhl, D. (2007). Steps toward a science of service systems," *Computer*, 40, 71-77.

iSchools (n.d.). The iSchools. Retrieved September 21, 2010 from http://www.ischools.org/site/.

# A Comparative Study on World Universities Rankings: A Bibliometric Approach

**Pei-Yu Liao and Kuang-Hua Chen***
Department of Library and Information Science
National Taiwan University, Taiwan
{E-mail: sophie.peiyu@gmail.com; khchen@ntu.edu.tw}

**ABSTRACT**

International universities rankings have become a focus in recent years, since the results have great impacts on universities and call attention of governments, organizations, and the public around the world. The ranking results have been regarded as certain criteria for quality and competitiveness of universities. However, there are many organizations conducting on ranking activities from different perspectives. This study focuses on total ranking results reported by evaluation organizations and attempts to compare ranking results of each single ranking indicator in a bibliometric approach. This study discusses and figures out if there is any relevance or consistence among various ranking results. According to the preliminary results, the rankings reported in 2009 by Shanghai Jiao Tong University and the Higher Education Evaluation and Accreditation Council of Taiwan have moderate correlation in Kendall's coefficient of concordance and strong correlation in Spearman rank correlation coefficient. Furthermore, the ranking results between total ranking and ranking of single indicator in each evaluation organization have correlation to a certain degree.

## INTRODUCTION

Due to the globalization of higher education, the quality and competitiveness of universities have become important issues for the general public (Altbach, 2006; Hazelkom, 2008). Ranking activities have started up with the intense competition among universities. In the year of 2003, Shanghai Jiao Tong University of China announced an international universities ranking called "Academic Ranking of World Universities" (ARWU), and this made a very beginning of global ranking for universities.

In recent years, many organizations in England, Spain, Taiwan, Russia, and France have conducted on international universities rankings from different aspects (Cybermetrics Lab, Centro de Ciencias Humanasy Sociales, Consejo Superior de Investigaciones Científicas, 2009; Higher Education Evaluation and Accreditation Council of Taiwan, 2009; MINES ParisTech, 2010; RatER,2010; Shanghai Ranking Consultancy & Shanghai Jiao Tong University, 2009; The Times Higher Education Supplement & Quacquarelli Symonds, 2009). Four rankings for world universities out of many others are well-known: "Academic Ranking of World Universities" (ARWU) implemented by Shanghai Jiao Tong University of China, "World University Rankings" (WUR) implemented by Times Higher Education in England, "Webometrics Ranking of World Universities" (WRWU) implemented by Cybermetrics Lab in Spain, and "Performance

* Corresponding author

Ranking of Scientific Papers for World Universities" (PRSPWU) implemented by the Higher Education Evaluation and Accreditation Council of Taiwan.

As a matter of fact, the general public, faculty, students, governments, and companies have taken a serious look at these ranking results and regarded them as some kind of criteria for educational quality. However, these rankings were carried out using different methodologies in various perspectives. For example, the ranking indicators designed by Shanghai Jiao Tong University emphasize excellent academic achievement; the Higher Education Evaluation and Accreditation Council of Taiwan emphasizes academic achievement based on publications of research outputs; the Times Higher Education emphasizes the reputation of universities; Cybermetrics Lab uses Webometric approach to investigate the dissemination and sharing of academic information in Internet.

Bibliometrics, an important research field of library and information science, is widely applied in many aspects, such as periodical selection, evaluation of collections and bibliographies, the historical and sociological development vein, and the productivity and use of documents (Lawani, 1981). The application of bibliometrics has been also extended to universities rankings and has resulted in related discussions (Weingart, 2003; Van Raan, 2005; Van Raan, Moed, and Van Leeuwen, 2006).

World universities rankings have provoked some issues, especially the objectivity and suitability of ranking indicators in evaluation organizations (Altbach, 2006; Marginson, 2007; Ioannidis, Patsopoulos, Kavvoura, et.al., 2007; Billaut, Bouyssou, and Vincke, 2010; Vo, Sreeram, and Vo, 2010). However, it seems that discussions of "ranking indicators" receive much more attention than those of "ranking results". Hence, this study aims to examine the ranking results reported by different evaluation organizations, i.e., ARWU, WUR, and PRSPWU, in bibliometrics approach, and attempts to investigate if there is any relevance or consistence among these ranking results.

## RESEARCH DESIGN

The methodology of secondary data analysis is used in this pilot study and two statistical tests are applied as well. Due to a problem of data gathering for WRWU, only three independent rankings for top 200 world universities in 2009 are used as research objects, i.e., ARWU, WUR, and PRSPWU. Two main research questions of this study are shown as follows.

- Compare differences among total rankings reported by ARWU, WUR, and PRSPWU in 2009;
- Compare differences among each world university ranking's total ranking and its single indicator ranking reported by ARWU, WUR, and PRSPWU in 2009, respectively. Be noted that not every indicator is analyzed; only bibliometric indicators are examined. Table 1 shows these bibliometric indicators.

**Table 1. Bibliometric Ranking Indicators**

| Name of Ranking | Bibliometric Ranking Indicators | Code |
|---|---|---|
| ARWU | Highly cited researchers in 21 broad subject categories | AHiCi |
| | Articles published in Nature and Science | ANS |
| | Articles indexed in Science Citation Index-expanded, and Social Science Citation Index | APUB |
| WUR | Research Excellence | Wavci |
| PRSPWU | Number of articles of the last 11 years | P11N |
| | Number of articles of the current year | PCN |
| | Number of citations of the last 11 years | P11ci |
| | Number of citations of the last 2 years | P2ci |
| | Average number of citations of the last 11 years | P11avci |
| | H-index of the last 2 years | P2H |
| | Number of highly cited papers | PHiCiN |
| | Number of articles of the current year in high-impact journals | PHimjN |

Before carrying out analyses for various ranking results, the overlapped universities listed in the top 200 universities reported by the three evaluation organizations have to be figured out. Secondly, examine each bibliometric ranking indicator (as shown in Table 1), and transform original scores into ranking orders. Thirdly, reassign the original total ranking orders to make ranking orders successive. Finally, Spearman rank correlation coefficient and Kendall's coefficient of concordance are used to find out if there exists any relevance or consistence among the ranking results. Figure 1 shows the research procedure.

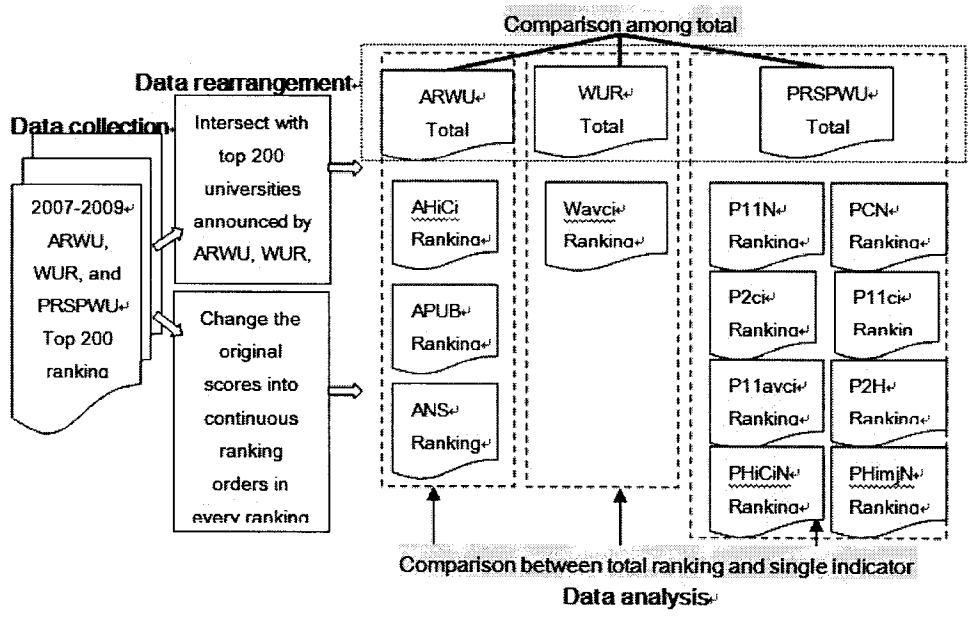


**Figure 1. Research Procedure**

**PRELIMINARY RESULTS**

The rankings reported in 2009 are used as target data for this pilot study. To answer the first research question if there is any relevance or consistence in the world university rankings among ARWU, WUR, and PRSPWU, the total rankings in 2009 are examined and compared. According to the results of statistical test (please refer to Table 2), the total rankings of ARWU and PRSPWU have correlation coefficients over 0.6 in both Spearman and Kendall, which exhibit moderate correlation.

**Table 2. Total Rankings Comparison for 2009 Data**

| | WUR | ARWU | PRSPWU |
|---|---|---|---|
| WUR | 1.000<br>.<br>. | .613**<br>*p*=.000<br>n=115 | .582**<br>*p*=.000<br>*n*=115 |
| ARWU | | 1.000<br>.<br>. | .824**<br>*p*=.000<br>*n*=115 |

| | WUR | ARWU | PRSPWU |
|---|---|---|---|
| WUR | 1.000<br>.<br>. | .451**<br>*p*=.000<br>n=115 | .412**<br>*p*=.000<br>*n*=115 |
| ARWU | | 1.000<br>.<br>. | .638**<br>*p*=.000<br>*n*=115 |

****p<.01 (Left: Spearman rank correlation coefficient; Right: Kendall's coefficient of concordance)**

In order to know if there is any relevance between the total ranking and single indicator ranking, i.e., the second research question, each ranking for bibliometric indicator is compared to its own total ranking. The results of statistical test show that some ranking indicators have correlation coefficient over 0.6 with their own total rankings in Spearman and Kendall. For example, the results of the total ranking of ARWU versus the ranking of indicator AHiCi and ANS are shown in Table 3. Besides, the results of the total ranking of PRSPWU versus the rankings of indicator P11ci, P2ci, P2H, PHiCiN, and PHimjN have correlation coefficient over 0.7 and even over 0.9 in Spearman and Kendall, which show strong correlation. Please refer to Table 4 and Table 5. However, there is a weak correlation between the total ranking of WUR versus the ranking of indicator Wavci, having the correlation coefficient no more than 0.4 in Spearman and Kendall (please refer to Table 6).

**Table 3. Total Ranking vs. Single Indicator Ranking for 2009 ARWU's Data**

| | At09 | AHiCi09 | ANS09 | APUB09 |
|---|---|---|---|---|
| At09 | 1.000<br>.<br>. | .765**<br>*p*=.000<br>*n*=200 | .757**<br>*p*=.000<br>*n*=200 | .681**<br>*p*=.000<br>*n*=200 |

| | At09 | AHiCi09 | ANS09 | APUB09 |
|---|---|---|---|---|
| At09 | 1.000<br>.<br>. | .619**<br>*p*=.000<br>*n*=200 | .610**<br>*p*=.000<br>*n*=200 | .526**<br>*p*=.000<br>*n*=200 |

****p<.01 (Left: Spearman rank correlation coefficient; Right: Kendall's coefficient of concordance)**

**Table 4. Total Ranking vs. Single Indicator Ranking for 2009 PRSPWU's Data (Spearman)**

| | Pt09 | P11n09 | PCN09 | P11ci09 | P2ci09 | P11avci09 | P2H09 | PHiCiN09 | PHimjN09 |
|---|---|---|---|---|---|---|---|---|---|
| Pt09 | 1.000<br>.<br>. | .781**<br>*p*=.000<br>*n*=200 | .776**<br>*p*=.000<br>*n*=200 | .933**<br>*p*=.000<br>*n*=200 | .954**<br>*p*=.000<br>*n*=200 | .483**<br>*p*=.000<br>*n*=200 | .884**<br>*p*=.000<br>*n*=200 | .896**<br>*p*=.000<br>*n*=200 | .909**<br>*p*=.000<br>*n*=200 |

****p<.01 ( Spearman rank correlation coefficient)**

**Table 5. Total Ranking vs. Single Indicator Ranking for 2009 PRSPWU's Data (Kendall)**

| | Pt09 | P11n09 | PCN09 | P11ci09 | P2ci09 | P11avci09 | P2H09 | PHiCiN09 | PHimjN09 |
|---|---|---|---|---|---|---|---|---|---|
| Pt09 | 1.000 | .600** | .596** | .791** | .838** | .330** | .731** | .738** | .754** |
| | . | *p*=.000 | *p*=.000 | *p*=.000 | *p*=.000 | *p*=.000 | *p*=.000 | *p*=.000 | *p*=.000 |
| | . | *n*=200 | *n*=200 | *n*=200 | *n*=200 | *n*=200 | *n*=200 | *n*=200 | *n*=200 |

****p<.01 (Kendall's coefficient of concordance)**

**Table 6. Total Ranking vs. Single Indicator Ranking for 2009 WUR's Data**

| | Wt09 | Wavci09 |
|---|---|---|
| Wt09 | 1.000 | .400** |
| | . | *p*=.000 |
| | . | *n*=200 |

| | Wt09 | Wavci09 |
|---|---|---|
| Wt09 | 1.000 | .276** |
| | . | *p*=.000 |
| | . | *n*=200 |

****p<.01 (Left: Spearman rank correlation coefficient; Right: Kendall's coefficient of concordance)**

## CONCLUSIONS

According to the preliminary results, we find that not all of the total rankings for world universities exhibit strong correlations, only total rankings of ARWU and PRSPWU (both rankings focus on academic research performance) have stronger correlation. It shows that the similar ranking perspectives result in the similar results. At the first glance, the result seems straightforward. Please be noted the perspectives may be similar but actually the approaches are very different.

In addition, the rankings of certain single ranking indicators are related to their own total ranking, and even have strong correlation (such as some ranking indicators used in PRSPWU). This finding can be insightful, while we are confronted with a design of ranking system and have to decide involved indicators. That is to say, it is possible to find out ranking indicators with high degree of discriminativeness or representativeness.

We will extend this pilot study in temporal dimension and focus on additional research questions in future research: (1) compare single ranking indicators among different rankings of world universities; (2) examine the "Research Excellence" indicator of WUR to see if the change of citation tools (from Web of Science in 2006 to Scopus in 2007) has different impacts on rankings.

## REFERENCES

Altbach, P. (2006). The dilemmas of ranking. International Higher Education, 42, 2-3.

Billaut, J.C., Bouyssou, D., and Vincke, P. (2010). Should You Believe in the Shanghai Ranking? An MCDM View. Scientometrics, 72(1), 25-32.

Cybermetrics Lab, Centro de Ciencias Humanasy Sociales, Consejo Superior de Investigaciones Científicas. (2009).

Webometrics ranking of world universities. Retrieved October 31, 2010, from http://www.webometrics.info/

Hazelkorn, E. (2008). Globalization, internationalization, and rankings. International Higher Education, 53, 8-10.

Higher Education Evaluation and Accreditation Council of Taiwan (2009). Performance Ranking of Scientific Papers for World Universities－2007, 2008, 2009 . Retrieved October 31, 2010, from http://ranking.heeact.edu.tw/

Ioannidis, J.P.A., Patsopoulos, N. A., Kavvoura, F.K., et.al. (2007). International ranking systems for universities and

institutions: a critical appraisal. BMC Med,5. Retrieved October 31, 2010, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2174504/

Lawani, S. M. (1981). Bibliometrics: Its Theoretical Foundations, Methods and Applications. Libri, 31(4), 294-315.

Marginson, S. (2007). Global university rankings: where to from here? Communication to the Asia-Pacific Association for International Education, National University of Singapore, 7-9, March, 2007. Retrieved October 31, 2010 , from http://mt.educarchile.cl/mt/jjbrunner/archives/APAIE_090307_Marginson.pdf

MINES ParisTech.(2010). International Professional Ranking of Higher Education Institutions – 2007, 2008, 2009.Retrieved April 10, 2010, from http://www.ensmp.fr/Actualites/PR/EMP-ranking.html

RatER. (2010). Global Universities Ranking. Retrieved October 31, 2010, from http://www.globaluniversitiesranking.org/

Shanghai Ranking Consultancy & Shanghai Jiao Tong University. (2009). Academic ranking of world universities – 2003, 2004, 2005, 2006, 2007, 2008, 2009. Retrieved October 31, 2010, from http://www.arwu.org/

The Times Higher Education Supplement & Quacquarelli Symonds. (2009). World university rankings –2004 2005, 2006, 2007, 2008, 2009. Retrieved October 31, 2010, from http://www.timeshighereducation.co.uk/hybrid.asp?typeCode=430&pubCode=1&navcode=105

Van Raan, A.F.J. (2005). Fatal Attraction: Conceptual and methodological problems in the ranking of universities by bibliometric methods. Scientometrics, 62(1), 133-143.

Van Raan, A. F. J., Moed, H. F., and Van Leeuwen, T. N. (2006). License to Rank. Coimbra Group Annual MeetingUniversity of Tartu. Retrieved November 3, 2010, from http://www.ut.ee/coimbra2006/orb.aw/class=file/action=preview/id=166720/TartuWebsite.pdf

Vo, B. T., Sreeram, V., and Vo, B. N. (2010). On the Assessment of University Research Impact: Towards Simplicity, Transparency and Fairness. TECH REPT. Retrieved November 3, 2010, from http://www.highimpactuniversities.com/uwarpi2010-article.pdf

# Scholarly Publishing Services in the University Library: Sharing the Experience of National Taiwan Normal University

**Wei-Ning Cheng, Wen-Chieh Lin, Chao-Chen Chen, Hao-Ren Ke**
Graduate Institute of Library & Information Studies
National Taiwan Normal University, Taiwan
{ E-mail:babybabylovening@gmail.com; g5675673@gmail.com;
cc4073@ntnu.edu.tw; clavenke@ntnu.edu.tw}

## ABSTRACT

Since the emergence of the Internet, not only have the channels of scholarly communication and the types of scholarly publishing changed, but also how information is exchanged, searched and shared in scholarly communities has diversified. The phenomenal adoption of online publication has challenged how university libraries provide publishing services. Keeping current with academics making research papers available through open access, university libraries are offering journal publishing services online. In order to respond to the changing environment of scholarly communication, the National Taiwan Normal University (NTNU)Library has been experimenting with the use of Open Journal Systems (OJS) as a tool for publishing scholarly journals.

## INTRODUCTION

University libraries have long been playing an important role in scholarly communication by supporting scholarly research, education, and management, and providing various kinds of information for users. They also keep cooperating with scholars and scholarly publishing to ensure that the scholarly communication system functions properly (Su, 2002; Chiu, 2006; Wu & Chen, 2008). The Internet has reshaped various scholarly communication activities, and not only the scholarly communication tools but also the type of publishing are being transformed and diversified. This transformation is also simultaneously changing the way information is exchanged, searched and shared in the scholarly community (Lo & Huang, 2005; Wu & Chen, 2008; Hahn, 2008a), and bringing about a change in the role played by the university library in the field of scholarly communication.

In view of these changes, university libraries should be more positive and innovative. They should also make every effort to change their role in providing data storage and access into an institution capable of creating and disseminating information, as well as being a publisher of scholarly works in order to promote self-value (Wu & Chen, 2008; Steele, 2005; Hahn, 2008b). The basic responsibility of university libraries is to take charge of the creation, preservation and dissemination of scholarly materials, especially during a time when university publishers are not yet mature (Chiu, 2006).

Because university presses in Taiwan are in the infant stage, Taiwanese scholarly journals have insufficient publishing channels; therefore, most departments and schools manage their own journals. However, due to the lack of

human resources in each department, there is no long-term specialist to manage the production of scholarly journals, and there is an acute lack of streamlined systems or procedures (Chen, 2009). Therefore, the purpose of this research lies in discussing the possibility that university libraries involving in the provision of the publishing services, especially as publishers of scholarly electronic journals.

## LITERATURE REVIEW

A scholarly communication system relates participants' interactions and information exchange. Members who take part in scholarly activities affect each other. Because information technology is constantly innovating, the way scholars disseminate information in each domain is also affected. The deepest influence is the Internet, and a new scholarly communication mode has been generated when the activities of the scholarly communication system were changed by networked communication technology. This new scholarly communication mode means that publishing and publishing activities such as interaction, business models and peer reviews by the members of the scholarly community are presented in a new format, such as E-only Journals (Hahn, 2008a).

Scholarly publishing is a special type of publishing that is part of the scholarly communication system. In the scholarly communication environment, the scholarly community often disseminates research achievements by publishing them. The rapid development of information technology and the development of the Internet have made online/electronic publishing a major dissemination media. This brand new scholarly communication mode (Wang, 2003; Kling & McKim, 1999) has made a great influence on the process of scholarly publishing. However, although the media for access and dissemination has changed from the traditional paper into the digital type, the structure of scholarly publishing itself is unchanged.

At the same time, the Internet has also been changing the methods of data collection, organization and dissemination, and causes libraries to offer diversified services (Yang, 2004). The emergence of institutional repositories, open access and search engines has developed multiple scholarly dissemination channels and publication types (Wu & Chen, 2008; Hahn, 2008b). These developments encourage libraries to become publishers and not to remain as the consumers downstream in the publishing industry. Therefore, university libraries have started to provide publishing services for establishing a closer relationship with each part of the process of the scholarly communication system.For example, in the United States, the University of Michigan Library and Cornell University Library have established the Scholarly Publishing Office and Center for Innovative Publishing, respectively, to offer digital scholarly publishing services; the Office of Digital Scholarly Publishing at Penn State University Library, and University of California Libraries' eScholarship are also using digital media tools to facilitate the development of scholarly dissemination.

Impacted by the digital technology, researchers frequently use search engines to discover the information they need. Unless looking for undigitalized files, they rarely use paper resources in libraries (Conley & Wooders,2009). In a lot of digital scholarly resources, E-journals are the most commonly used resources used by of researchers. According to the report "Research Library Publishing Services: New Options for University Publishing" by ARL in 2008, among all universities in the United States, 88% reported that journals has been published, 79% reported that they are involved in monographic publishing, 71% of conference papers and proceedings(Hahn,2008c). Figure 1 indicates that E-journal (including E-only and electronic and print) is the primary format of publication no matter which types of journals. In

view of this, it can be said that scholarly electronic journals are the main form of publishing in university libraries.

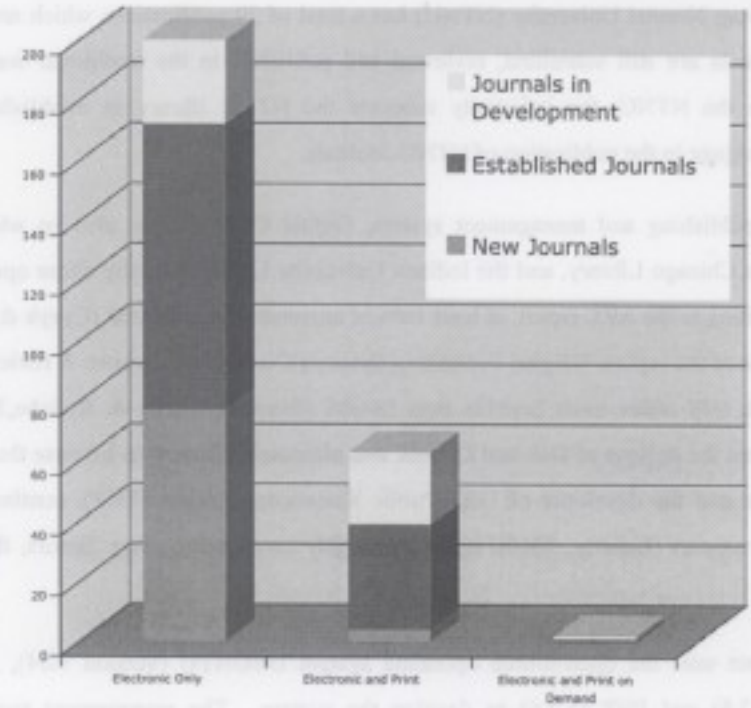


**Figure 1: Types of Journals and Journal formats**

**Note. rary Publishing Services : New for University Publishing," by K. L. Hahn, 2008, Washington, DC: Association of Research Libraries.**

From the perspective of journal editors,the features of library publishing should include permitting users to access the information they need, ease of management, and using inexpensive facilities to store data (Colin, 2005; Xia, 2009). In addition to librarians as intermediaries and encouraging journal editors proactively taking participation in the publishing project, library publishing should also have a system as the technology platform to support editors.For this reason, both University of Illinois at Chicago Library and Kraemer Family Library of the University of Colorado at Colorado Springs in the United States use the Open Journal System (OJS) as the platform to carry out their scholarly e-journal publishing services.Besides, in Greece, the Library & Information Center at the University of Patras uses the Open Journal System (OJS) to establish a digital publishing platform, which has been rebranded as "Pasithee", to create an effective scholarly dissemination channel for knowledge exchange. Considering that digital services are the mainstream, The Kyoto University Library in Japan also uses OJS to establish an e-journal platform. In consideration of establishment cost, stability and scalability, the University of Technology Sydney Library in Australia also chose OJS as their scholarly electronic journal publishing platform.

It can be seen from the above examples that university libraries in other countries are starting to manage scholarly publishing and are helping other units in their universities to publish scholarly e-journals by developing a digital publishing platform. Clearly, these changes are in response to the change in the scholarly communication environment, and scholarly e-journals published by the libraries would be the trend around the world. (Tsuzuki, 2009)

## OUR EXPERIENCE

The National Taiwan Normal University (NTNU) has a total of 29 publications which are published and managed by 22 units. The journals are still submitted, reviewed and published in the traditional way. In order to assist the publication process in the NTNU, the university supports the NTNU library in establishing a centralized digital publication system to engage in the publication of NTNU Journals.

Another journal publishing and management system, Digital Commons, is also be widely used. However, the University of Illinois at Chicago Library, and the Indiana University Libraries finally chose open-source software due to limited funding. According to the ARL report, at least 10% of universities use DPubS (Cyzyk & Choudhury, 2008; Hahn, 2008c), but on the basis of the report, "Digital Publishing Systems Comparison Report: A review of DPubS and OJS" by Samuels et al in 2008, OJS offers more benefits than DPubS (Samuels, Griffy & Kaliebe,2008). Indiana University Libraries also considered the options of OJS and DPubS, and ultimately chose OJS because the system's capabilities are easy for editors to use and the developer of OJS, Public Knowledge Project (PKP), continuously provides software updates and technical support (Laherty, 2010). After thoroughly considering many factors, the NTNU Library finally chooses the OJS.

The NTNU project uses the open-source operating system UBUNTU (version 9.04), Apache (version 2.2.11), MySQL (version 5.0.7.5) and PHP (5.2.6) to develop the system. The management tool phpMyAdmin (version 3.1.2deb1ubuntu0.2) is used to administer the software and OJS version 2.3.1.2 is used for development.

The system provides the user with 9 different roles to chose from, namely, Author, Editor, Journal Manager, etc. The system process is shown in Figure 2.

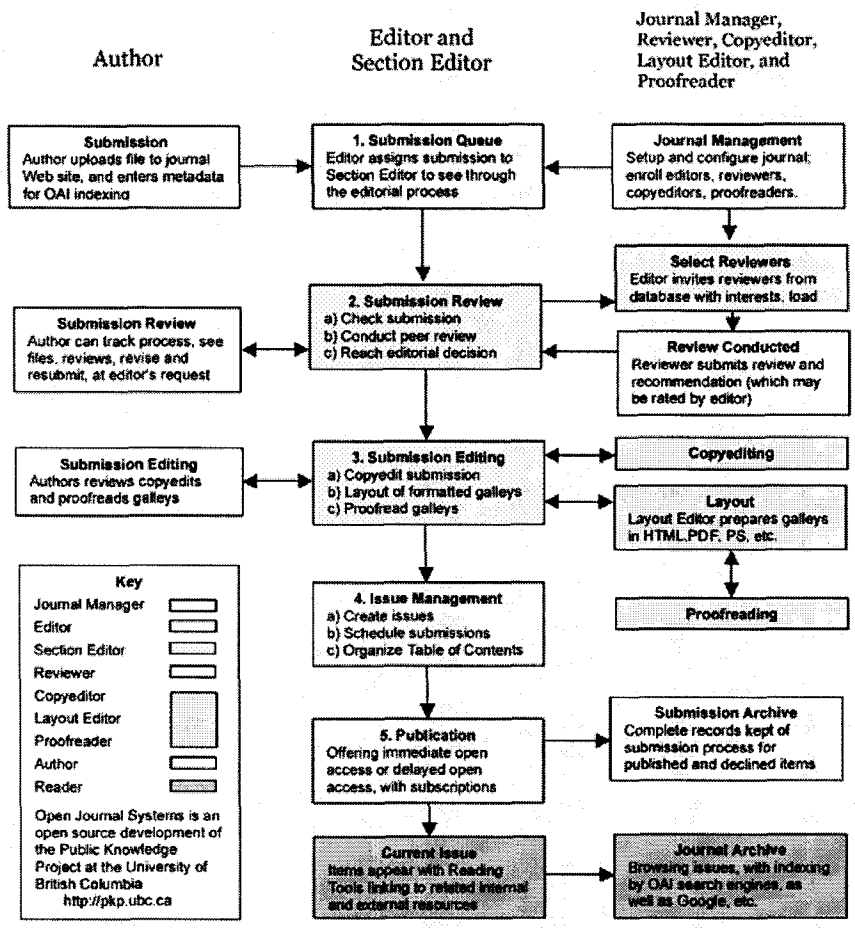


**Figure 2: OJS Editorial and Publishing Process**

***Note.* Resource are available from http://pkp.sfu.ca/**

Among the managers of the 29 NTNU journals, 10 of them volunteered test the system. Our project team held training and education courses on August 15th and 28th, 2010 to teach the volunteers how to use OJS. Other units also joined the courses in these day, and the number of participants were 25 and 22, respectively. In the second training and education courses, our team asked the journal editors and assistants to fill out a questionnaire.The purpose of this questionnaire is to understand the operation of journals, their opinions on the open access journal system offered by the NTNU Library, and which kinds of scholarly electronic journal publishing services that the NTNU library can provide. The response rate is 86%. According to the responses, it can be determined that the most serious problem that the journal publishing units encounter is the scarce human resources and funding. The majority of journal editors and assistants think that the system is a little bit hard to operate because the interface is complicated,and the terms used in the Chinese interface is hard to understand. However,they still believe that the system can help them to save human resources and time. They also hope library not only can provide human resources but also can assist them to find resource of funding.

**Table 1: Pilot Journals in the NTNU OJS Project**

| Colleges | | Department | Journal Title |
|---|---|---|---|
| Scholarly Department | Education | Education | Journal of Educational Research |
| | | Chinese Association of Gifted Education (Special Education) | Journal of Gifted Education |
| | | Educational Psychology and Counseling | Bulletin of Education Psychology |
| | | Taiwan Guidance and Counseling Association (Educational Psychology and Counseling) | Chinese Journal of Guidance and Counseling |
| | | Library & Information Studies | Journal of Library and Information Science |
| | Technology | Industrial Education | Journal of Technological and Vocational Education |
| | Liberal Arts | Taiwan Culture, Languages & Literature | Monumenta Taiwanica |
| University Centers | | Center for Education Research and Evaluation | Contemporary Educational Research Quarterly |
| | | Special Education Center | Special Education quarterly |
| | | Science Education Center | Science Education Monthly |

## FINDINGS

Our project team started developing the system from May 2010, and in the first several days, we translated the terms of the user interface, and debugged and modified some capabilities. At the same time, we held a system-wide seminar to ask for test volunteers and held training sessions. After these processes, we find the following problems:

1. Some units have never published an e-journal, and do not understand the meaning and spirit of open access.
2. The system interface is too complicated for users to operate.
3. Not all of the editors want to participate in the educational training.
4. The terms used in the Chinese interface are hard to understand.
5. The menu to switch the interface languages is not obvious.
6. The system lacks the following functionality:

(1) Personalized services

(2) Advanced search

(3) Subject terms and/or thesaurus

(4) Hot articles

To resolve the above problems, we propose the following suggestions:

1. The library should explain the meaning and spirit of open access more proactively.

2. In addition to holding the educational training, the library should proactively contact and help every unit solve problems.

3. The training courses should be recorded and put on the system's homepage along with an operation manual for user reference.

4. OJS was designed in another country, and adapting it for our use has led to language switch and translation problems. We suggest that the library hire a professional translator to translate the system language.

5. The default language of the NTNU's open journal system is Chinese, so it will be hard for users to find the language switch menu if they cannot read Chinese. We suggest that the system set up another homepage to distinguish between the Chinese and English interface.

6. Four suggestions regarding the system functionality

(1) Personalized services such as "My Favorites" and "Recommended Journal Articles"

"My Favorites" can enable users to mark articles which they like and think useful. When the next time they login, they can find those articles in the "My Favorites" section. In addition, the system will also recommend other articles that might of interest by means of the "Recommended Journal Articles" capability.

(2) Advanced search

Because OJS only provides a simple search facility, we propose that, in addition to increasing query fields such as subject words and keywords, it should also increase the search patterns, such as homonyms, fuzzy matches, precise matches, regular expressions and visual search patterns. We can also record personal query history, so that users can view the retrieved records when they need to, and we can limit the results of the search by subject, authors, keywords and years.

(3) Subject terms and/or thesaurus

Provide related subject terms and/or thesaurus when users browse a journal.

(4) Hot articles

Show the most popular articles in all journals or a single journal for users to browse.

## CONCLUSION

The NTNU Library begins to carry out its Publishing Services, and the pilot testing is expected to be completed by the end of Year 2010. After that, NTNU will formally launch the open-access journals system. In addition to expecting the NTNU Library develops better publishing services, we also hope to share our experience with other university libraries.

## REFERENCES


Chiu, J.Y. (2006).*學術傳播與期刊出版*[Scholarly Communication and Journal Publishing].Taipei City: Yuan-Liou.

Chen, K.H. (2009). *引文索引與臺灣學術期刊之經營*[Citaion Index and the business of Scholarly Journals in Taiwan]. *Humanities and Social Newsletter Ouarterly*,10(3),68-81.

Colin, S. (2005). The Library's Perspective on Scholarly Publishing in the 21ST Century. In G.E.Gorman(Ed.), *Scholarly Publishing in Electronic Era*(pp.35-54). London: Facet Publishing.

Cornell University Library. (2009). Center of Innovative Publishing, September 22, 2010, from http://cip.cornell.edu/webdocs/index.html

Conly, J.P. & Wooders, M.(2009).But what have you done for me latly?Commercial Publishing,Scholarly Communication,and Open Access.Economic Analysis % Policy,39(1),71-87.

Cyzyk,M., & Choudhury,S.(2008).A survey and evaluation of open-source electronic publishing systems. (Tech. Rep.).Baltimore, MD :Sheridan Libraries, Johns Hopkins University.Retrieved September 30, 2010. from https://jscholarship.library.jhu.edu/handle/1774.2/32737?show=full

Georgiou,P. & Tsakonas,G.(2010, June) Digital Scholarly Publishing and Archiving Services by Scholarly Libraries : The case study of University of Patras. Paper Presented in 39th Annual Conference of LIBER., Aarhus, Denmark.

Hahn, K. L. (2008a). Talk About Talking About New Models of Scholarly Communication. *Journal of Electronic Publishing,* 11(1). Retrieved November 13, 2009, from http://dx.doi.org/10.3998/3336451.0011.108

Hahn, K. L. (2008b). Publishing Services : An Emerging Role for Research Libraries.[Electronic version].*EDUCAUSE Review*, 43(6), 16-17.

Hahn, K. L. (2008c). *Research Library Publishing Services : New for University Publishing.* Washington, DC: Association of Research Libraries.

Kling, R. & McKim, G. (1999). Scholarly communication and the continuum of electronic publishing. *Journal of the American Society for Information Science,* 50(10), 890-907.

Laherty, J.(2010, March) Open Journal Systems: An Open Source Alternative to Commercial Online Journal Systems. Paper Presented in UMASS Amherst Campus Center.

Lo ,C.C. & Huang, H. C. (2005).*機構典藏相關政策之探討*[A Study on Relevant Policies for Institutional Repositories].*Journal of Educational Media & Library Sciences,43*(2),191-214.

Penn State University Library. (2009).Office of Digital Scholarly Publishing. Retrieved September 22, 2010. from http://www.libraries.psu.edu/psul/odsp.html

Samuels, R G., Griffy H., & Kaliebe K.(2008).Digital Publishing Systems Comparison Report: A review of DPubS and OJS. Retrieved September 29, 2010. from http://pkp.sfu.ca/node/2695

Steele, C. (2005). The Library's Perspective on Scholarly Publishing in the 21st Century. In J. L. Wulff,(Ed.), *Scholarly Publishing in an Electronic Era: International Yearbook of Library and Information Management 2004/2005(pp. 35-54.).* London : Facet Publishing.

Su, S. (2002).*電子資訊資源、電子出版、學術傳播*[Electronic Information Resources, Electronic Publishing and Scholarly Communication].*Journal of Librarianship and Information Studies,40*,23-2.

Tsuzuki, Ichiro.(2009).図書館は出版社になる:電子ジャーナル出版支援および大学広報としての京都大学学術情報リポジトリ事業[Library as Publisher : Kyoto University Research Information Repository Project's strategies and further developments]. Journal of College and University Libraries,85,63-73.

University of California Libraries. (2009). eScholarship. Retrieved September 25, 2010, from http://www.escholarship.org/

University of Michigan Library. (2009). Scholarly Publishing Office. September 23, 2010, from http://www.lib.umich.edu/spo/

Wang,M.L. (2003).*電子期刊興起及其對學術傳播影響的探討*[Electronic Journals and Scholarly Communication].*Bulletin of Library Association of the Republic of China*,71,61-78.

Wu, S. C. & Chen, H. H.(2008).*學術出版價值鏈變遷及圖書館角色之概念性初探*[Exploratory Analysis on the Transition of Value Chain of Scholarly Publishing and the Changing Role of Library]. *National Central Library Bulletin*,(2),23-58.

Yeung, M.H.(2004).*數位時代大學圖書館的資訊服務*[Information Services of University Library in Digital Age]. 2004 Cross-strait development of Library and Information Science and Education Seminar. in Liaoning Province. Retrieved September 29, 2010. from http://nccur.lib.nccu.edu.tw/handle/140.119/2190

# A Study on the Application of the Collection-Level Description to Taiwan's Digital Archives

**Hsueh-Hua Chen, Ya-Chen Ho**
Department of Library and Information Science
National Taiwan University, Taiwan
{E-mail: sherry@ntu.edu.tw; r94126014@ntu.edu.tw}

**ABSTRACT**

This study looks into the application of the collection-level description to TELDAP in order to solve the issues of handling its massive quantity of item-level metadata, which had become difficult for users to use effectively. The scope of this study covers the digital resources produced by four major digital archiving institutions, using the Dublin Core Collection Application Profile (DCCAP) as standard for describing their collections. The implementation process is divided into five stages. In order to facilitate the application of collection-level description, we have refined the properties of 16 out of 30 DCCAP elements. In the future, we recommended to fortify the relationships between item-level and collection-level metadata. The similarities and differences between the suitability of the fields of science and the humanities for the application of collection level-descriptions should also be explored.

**INTRODUCTION**

Responsible for digitizing Taiwan's important cultural heritages, the Taiwan e-Learning and Digital Archives Program (TELDAP) has produced over three million records of metadata up to now. However, as the number of data grows all the more immense, it becomes difficult for users to easily retrieve and utilize these information, while data managers also find it hard to fully grasp the resources as a whole. This study thus attempts to create a collection-level description model for Taiwan's digital archives. It is hoped that the process will be able to act as a reference for other similar endeavors, and that the results will become a basis for the future creation of collection-level descriptions for digital archives.

For a long time, it has been usual practice for archiving institutions such as libraries and museums to describe their resources by item, such as a book or a painting. Though descriptions at the item-level are rich and detailed, if users are unfamiliar with the characteristics of the resources when faced with the immense amount of data scattered among the archives, it is often easy to lose direction in the oceans of information. Collection-level descriptions thus assist in sorting out the limitations of item-level descriptions.

As an aggregation of individual items, a "collection" varies in genre and size, and can exist in either physical or digital form. Put simply, "Any aggregation of individual items" can be designated as a "collection" (Johnston & Robinson, 2002). The grouping of a collection is based on common factors its items or resources may have between them (Chapman, 2006). Descriptions aimed at defining collections are thus known as "collection-level descriptions."

Collection-level descriptions reveal the existence and usability of collected resources, facilitating the exploration and discovery of resources for users. They allow users to overlook the resources from a higher perspective, gaining a clearer knowledge concept of each collection. The great quantities of information no longer appears unrelated and scattered, but are presented in a more useful manner for users; comparisons can be made while users select sections that interest them to make further explorations (Heaney, 2000).

The functions of the collection-level description can be discussed from the perspectives of both the user and the collection manager (CD Focus, 2001). For the user, collection-level descriptions can provide assistance in discovering, indicating, understanding, selecting and utilizing collection resources. On the whole, collection-level descriptions facilitate the grasping of resources for both managers and users (CD Focus, 2001; Chapman, 2006; Powell, Heaney, & Dempsey, 2000).

## RESEARCH DESIGN

The research scope of this study includes the digitized resources produced by the National Palace Museum, the National Science Museum, National Taiwan University and Academia Historica. The goal is to create collection-level descriptions for TELDAP's archives, in order to facilitate information retrieval for users and to improve resource management for managers. First, to determine the definition of collection-level description, relevant literature was thoroughly reviewed. Next, the principal internationally adopted description standards were analyzed by investigating related studies on the creation of collection-level descriptions both at home and abroad, from which the Dublin Core Collection Application Profile (DCCAP) was selected as the most suitable description standard for TELDAP to base its own methods of description on. In order to grasp the nature of the digitized results and the overall framework of the archives, semi-structure interviews were then conducted with 34 members of the project team, all of whom have in-depth understanding of respective collections and were familiar with the actual operation procedures. 73 collections were derived from these interviews, while the DCCAP description standard was revised according to the respective situation and collection characteristics of each institution. Finally, the research results were presented according to faceted classification on TELDAP's portal website to assist users with browsing and exploring through resources.

## RESEARCH RESULTS

After conducting analysis of the research results, the following points have been discovered:

1. The creation procedures of collection-level descriptions

1) Defining the scope of collections and the depth of their descriptions:

First, it is necessary to understand the contents of the resources and make preliminary distinctions. Because the defining of a collection can be conducted from variety of different facets, it is quite a complicated task. This study thus adopts the idea of "functional granularity" (Macgregor, 2003), which suggests that if a collection is "functional" and can accomplish certain purposes, then it is worthy of describing. In order to achieve the objective of better accessibility, collections are derived from already classified databases constructed by archiving institutions. This enables each collection to have corresponding databases to ensure that their collection-level descriptions functions for the purpose of improving accessibility.

2) Selecting the appropriate description standard:

In order to choose a suitable description standard from a variety of options, this study devised seven criteria: (1) Does the objective of the standard conform to the objectives of this project? (2) How is the reputation of the standard? (3) Has any other project adopted this standard? (4) How is the compatibility of the standard? (5) Is the standard easy to use? (6) Does the standard provide software tools? (7) Is the standard under proficient maintenance? After evaluating various standards according to these seven criteria, the DCCAP was selected as the description standard for this study.

3) Creating collection-level metadata:

Researchers and project members who are familiar with the contents and nature of a certain collection are interviewed in depth. After obtaining a comprehensive understanding of the structure and contents of the collections, the creation of TELDAP's collection-level metadata officially begins.

4) Designing a presentation interface:

An information system for collection-level description is created to present and display the project results. After the relationship between the knowledge structure of the website and the classification of subjects is determined, the completed metadata is sent into the system. Following the principles of faceted classification, the collections are presented according to such facets as subject, time span, archiving institution, title, data type, etc. The resources are thus easier to browse and discover, and accords more with the needs of users, simultaneously increasing the visibility and frequency of use of these collections.

5) Evaluation of operation results:

An evaluation procedure is devised in order to understand how much the collection-level descriptions and its interface has helped users, as well as any possibilities for further improvement.

2. The characteristics of TELDAP's collection-level description:

It was revealed, from the interview results and the previous experiences of researchers in creating collection-level descriptions, that the collection-level description of TELDAP has several characteristics:

1) TELDAP's collections are highly heterogeneous: The types and genres of collections within the scope of this study are highly diverse. They include images, manuscripts, specimens, photos, with contents encompassing subjects such as animals, plants, geology, anthropology, archives and rubbings; the long time-span, from specimens of the Cambrian Age to contemporary databases of ecological insect photos, stretches over 500 million years. Due to the heterogeneity of the collections, a range of problems was encountered while filling-out metadata, which is why the DCCAP description standards must be refined according to different situations.

2) The collection-level descriptions are constantly changing: Compared with item-level descriptions, collection-level descriptions are subject to constant change, which is why long-term maintenance is necessary.

3) The creation of collection-level description requires a certain level of knowledge in the particular field: The creation of collection-level description simultaneously involves describing and annotation. Thus the creators of metadata must have a broad and profound knowledge of collection contents for the completed information to fulfill the needs of users and also correspond with the characteristics of the collection. It would be most ideal if the creator of metadata possessed knowledge in both the related field and information organization; if it is not possible to meet such criteria, it is preferred that a specialist of the related field who has been taught the basic concepts of metadata fill-out the preliminary contents of metadata, while experts in information organization conduct revisions to standardize and structuralize the results.

4) The DCCAP is more suitable for the description of culture-related collections: It has been discovered through this study that the quality of collection-level description is also influenced by the nature of the collection's field. The quality of collection-level description of collections in culture-related fields (artifacts, paintings and calligraphy, archives etc) is distinctly better than that of science-related collections. It has thus been concluded that the design of the DCCAP seems to be more suitable for the former.

3. The revision of DCCAP description standards

Due to the heterogeneity and rapid growth of the TELDAP collections, directly applying DCCAP inevitably leads to certain difficulties. Thus, our study has reviewed all the problems that have been encountered during the creation of collection-level metadata, and brought forth corresponding solutions. To accord with the situation of TELDAP and the special features of different collections, the properties of 16 out of 30 DCCAP elements have been refined. For example, we expanded the Collection Description Terms recommended by DCMI, to more aptly describe the TELDAP collections.

## CONCLUSION

This study looks into the application of the collection-level description in order to solve the issues of handling TELDAP's massive quantity of item-level metadata, which had become difficult for users to use effectively. The implementation of the application can be divided into five steps: the first is to identify the scope of TELDAP collections, dividing TELDAP's digitized results appropriate collections; next, the appropriate description standard is applied; interviews are held to clearly understand the collection in order to enhance the creation of collection-level metadata; the final outcome is then presented by faceted classification to improve the quality of browsing through resources; finally, evaluation of operation outcome is conducted.

During the process of research, it has been discovered that the TELDAP collections are highly heterogeneous and constantly changing, while the creation of collection-level description requires a certain level of knowledge in the particular field. In addition, DCCAP is concluded to be more suitable for the description of culture-related collections. The descriptions of 16 of the 30 DCCAP elements were refined in order to make it even more suitable for the describing of TELDAP collections.

In the future, the creating and maintaining of collection-level metadata will be continued. In addition, the new facets of geographical coverage and collection genre will be added to the portal website to assist users in discovering resources

from a variety of new perspectives. It is also recommended that the relationships between the item-level and collection-level metadata be constructed for more well-rounded and efficient information retrieval. The similarities and differences between the suitability of the fields of science and the humanities for the application of collection level-descriptions should also be explored.

## ACKNOWLEDGEMENT

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## REFERENCES

CD Focus. (2001). Collection Description Focus. Retrieved December 25, 2009, from UKOLN Web site: http://www.ukoln.ac.uk/cd-focus/

Chapman, A. (2006). Tapping into collections. MLA West Midlands ICT Network Day Collection descriptions and cultural portals, University of Wolverhampton, Wolverhampton. Retrieved December 25, 2009, from http://www.ukoln.ac.uk/cd-focus/presentations/mla-WM-2006-july/mla-WM-2006-07-25.ppt

Dublin Core Collection Description Task Group. (2007). Dublin Core Collections Application Profile. Retrieved December 10, 2009, from DCMI Web site: http://dublincore.org/groups/collections/collection-application-profile/2007-03-09

Heaney, M. (2000). An Analytical Model of Collections and their Catalogues. 3rd issue, rev. Retrieved December 10, 2009, from UKOLN Web site: http://www.ukoln.ac.uk/metadata/rslp/model/amcc-v31.pdf

Johnston, P., & Robinson, B. (2002). Collections and Collection Description. Retrieved December 10, 2009, from UKOLN, CD Focus Web site: http://www.ukoln.ac.uk/cd-focus/briefings/bp1/bp1.pdf

Macgregor, G.(2003). Collection-level description: metadata of the future?. *Library Review, 52*(6), 247-250.

Powell, A., Heaney, M., & Dempsey, L. (2000). RSLP Collection Description. D-Lib Magazine,6(9). Retrieved December 15, 2009, from http://www.dlib.org/dlib/september00/powell/09powell.html

# F-Shaped Score Analysis: A Content Analysis Method for Website Homepage Design Strategy – With an Example Analysis for Telecom Company Website Homepages

**Charles Chen (Chen Qi Liang)**
wwwins Isobar Taiwan Inc., Taiwan
{E-mail: charles.chen@isobar.com}

## ABSTRACT

In this poster, the author introduces a webpage designing method, called "F-shaped score analysis". This method was inspired by several eyetracking-research findings conducted by Eyetools, Inc.(2006) and Nielsen (2006). And the author also demonstrates this method in analyzing 8 global telecommunication company websites, and identified three different homepage content strategies.

## INTRODUCTION

The design of homepage is the most critical part of an official website for any company and product brandings. Although the user-centered-design or other design methodologies will be good design research guidelines for website design projects, but the limitation of time and budget.

In some cases, designers and planners would only doing some competitors analysis or looking for some visual-design References for inspiration. This may not a good method for homepage design because designers seldom think about business goal but their visual and aesthetic taste. In some another cases, website planners would stand out and conduct a competitor analysis, and develop a website homepage communication idea or content strategy. But the competitor analysis conduct by planners for homepage design is always subjective and arbitrary. The planner's personal preference about look and feel is too easy to embed in a free-style competitor analysis. This situation forms an even worse tension and contradiction relationship between the clients, planners and designers.

In this poster, the author introduces a competitor analysis method for homepage design research. In this method, planners, information architects or researchers could conduct a competitor analysis for a domain or some similar websites more systemically. This poster will introduce this method and it's theoretical background. There is an analysis for telecom company website homepages, for demonstration how this method work.

## F-SHAPED PATTERN

There are researches revealed a similar user webpage scanning behavior pattern.

Two popular findings conducted by Eyetools Inc. (Eyetools, 2006) and Nielsen Nerman Group (Nielsen, 2006) showed that users' webpage scanning in a called "golden triangle" or "F-shaped" behavior pattern. The research

conducted by Eyetools Inc. was mainly with Google.com search result page, and "the implication of this can patterns for marketing purpose is that viewers tend to look at the upper-left portio of search results and ignore sponsors' links in the right column." (Duchowski, 2007). Nielsen(2006a) also inquiry other webpage besides search engine result page(SERP), and found that triangle shape is very general phenomenon in different types of webpage scanning behavior.

(Georg, 2009) also conducted an eye-tracking research with different information tasks (information foraging & page recognition). They found the salient regions of people's visual attention patterns when viewing Webpages is "the three regions center-left, top-left, and center-center seem to be most important for information foraging tasks." For page recognition tasks "the top-left, top-center, and center-left regions appear to be most important".

**Figure 1: Nilsen(2006) F-shaped pattern in eye-tracking research**

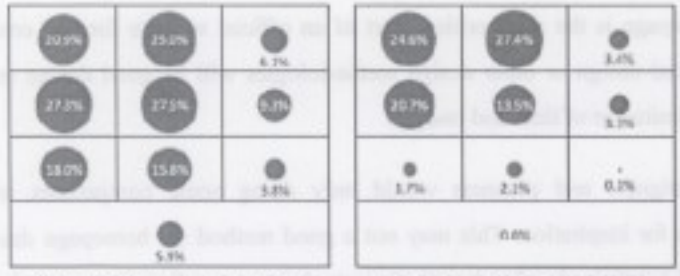


**Figure 2: Georg, B., Edward, C., & Meredith Ringel, M. (2009). Viewing frequency of the 10 page regions across all pages during the first second of the page views**

## F-SHAPED SCORE ANALYSIS

Inspired by several researches, the author designed a "F-shaped score" table. This idea is about the "hot zone" of a webpage economics. The more easily to catch the eyeball, should be put more important information for users. There are different information chunks crowing in the homepage. It's very difficult to ranking its importance of limited homepage size and location.

### F-Shaped Score Table

This table divides webpage in 4 areas:

- A: A triangle shape on the left-top area of website. A-area score is 5 because it's the most important and highest frequency visual attention area. It's width was determined by the main content on webpage, and the height was determined by the safety "first folder height" of webpage. The safety height was referred to Google

Browser Size (Bowden, A. ,2009), the 90% people can view 500px height in their browser first fold without scrolling down.

- B: Beside the A-area of website. People may looking for following content beside the F-shape, so this area has more frequency than any other areas.
- C: This area this the first fold of webpage with scrolling. According the Google Browser Size statistic, the 60% people can view upto 600px height.
- D: This area is the rest area of a webpage. Area D may take long on some webpage.

These heights (Area-A:500px and Area-C: 600px) are flexible for different research purpose or webpage design.

In most of homepage or landing page, it is important to keeping user awareness in the first sight of webpage. And it is critical for designer keeping important information in the first fold of webpage, to make sure customer could get the key information. This is the purpose for Area-A Height defining. But the "first sight" would be various in different webpage design. For example, it is "banner blindness" phenomenon (Nielsen, 2006b) making user inattention from big graphic picture – usually on the top of webpage. In this situation, the Area-A have to shift down a little bit. Area-A also could shift-right, in case of there is a vertical local navigation block at the left side in the webpage.

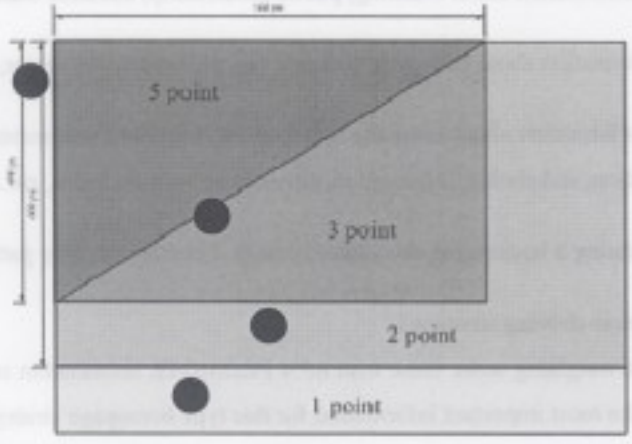


**Figure 3: F-shaped Score**

**Analysis Process**

There are 3 steps in F-shaped score analysis:

1. Chucking: Chucking webpage information into categories. One can put a webpage design, mockup or wireframe on to the score table directly. But I recommend one can analyze his webpage design into information chucks categories first. Chucking webpage information into different categories is helping analyzer to compare more webpages. After chucking webpage, one could get a wireframe-like webpage. It's good to web designer or planner using wireframe in F-shaped score analysis.
2. Scoring: Putting score table on the chucked page. And calculating category scores in webpages.

3. Comparing: Comparing different Webpages, and finding different webpage content strategy patterns.

## AN ANALYSIS FOR TELECOMMUNICATION COMPANY WEBSITE HOMEPAGES

In this following research analyzed 8 telecommunication company websites: AT&T (http://www.att.com/ ), Verizon (http:// www.verizon.com ), T-Mobile (US) (http:// www.t-mobile.com/ ), Telekom (T-Mobile Global http://www.telekom.com/ ), Vodafone UK (http://vodafone.co.uk ), Vodafone Global (http://www.vodafone.com/ ), KDDI (http://www.kddi.com/ ) and Telstra (http://www.telstra.com ) (see Figure 4). This research was conducted on 2009 March. Some websites may change a lot today.

There are 6 information chunk categories:

- **PRODUCT:** Information about its products, goods, and its category navigation system for consumer to find their products.
- **PROMOTE:** Information about promoting events and advertising banners.
- **TOOLS:** Information or functional items, like "sign-in"," sign-up", "forget password", "search", "select language", etc..
- **BRANDING:** Information about branding, public relationship, business social responsibility, etc..
- **SERVICE:** Information about consumer services, faq, online helping center, etc..
- **COMPANY:** Information about company information, copyright statements, legal statements, address and contact information, stakeholder information, sitemaps or website index, etc..

After chucking, calculating 8 homepages, the author identify 3 content strategy patterns:

- **Type A – Promote-driving strategy:**
  Homepages that weighting score more than 65% PROMOTE information called promote driving homepage. PROMOTE is the most important information for this type homepage strategy. For attracting more consumer, these PROMOTE information chucks are graphic and with dynamic animation. The AT&T and Verizon homepage fall into this type. Both homepage had the same content priority: the top 3 content category are PROMOTE, PRODUCT, SERVICE and both share over 80% layout weighting.
- **Type B - PR + Promote strategy:** Homepages that have to contain company information, and divide into two different domain names and websites. One is promote-driving, just the same with Type-A strategy; another one is purely company and public relationship information. This happened if this company was a global foundation holding and many local telecomm marketing brandings. Two websites have different objective and target audience.
- **Type C – Balanced strategy:** Homepages that fall into Type C only contain less 45% weighting of promotion information. But the priority of PROMOTE, PRODUCT, SERVICE, COMPANY is the same with Type A strategy, but the sharing rate is different. Because Type C homepages contain more information than Type A

& C, the length of Type C homepage is longer that Type A & B (KDDI & Telestra).

It was a case of KDDI website. During this research, KDDI revamped its website. The new KDDI website has a new and non-traditional layout with the same information – all the information chucks are hidden under the Promotion Ad Banners. The whole website looks like a unique big product promotion Ad banner, but information will show up when user mouse over those pictures. Non-traditional website layout, like new KDDI website, or many promotion mini-sites, cannot be analyzed in F-shaped score. The pattern of eye-ball movement in gazing Full-images website, is more like gazing a picture or a graphic poster. Users will not following the clue of traditional website elements.

## CONCLUSION

Content development strategy is important in any website project. But the strategy making process is vague and most rely on the best guessing by experts. The F-shaped score analysis is an efficient and formality competitor content analysis method for website designing, planning and information architecting.

Clarifying website content strategy, especially on the homepage, is a valuable process for any kinds of website development project. In most cases, homepage design is most "chaotic" decision making task; everyone has different interest, usually in personal-opinion, and tries to convince others. This process is always useless and cannot came out an objective conclusion. And those discussing always ended up in the order of "politic power" or "boss-centered-design", not in the designing methodology.

The F-shaped score analysis can provide a relative objective and consistence method for website homepage design research, and helping website project toward a better design management manner.


**Figure 4: Telecommunication company website homepages (Retrieval at 2009)**

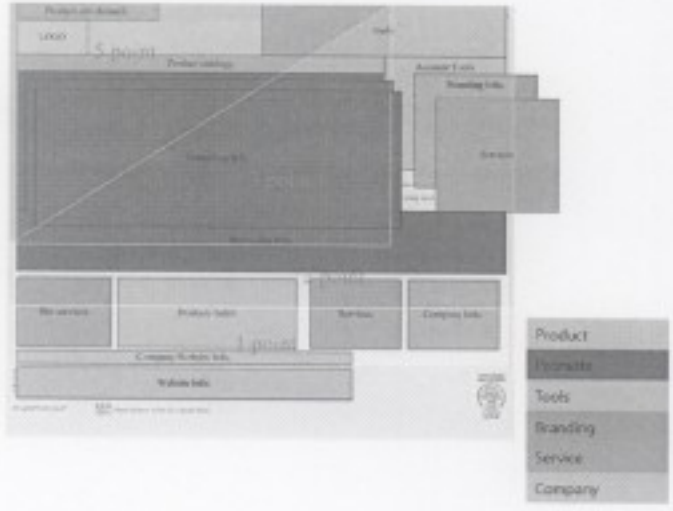


**Figure 5: Chunking AT&T website homepage**

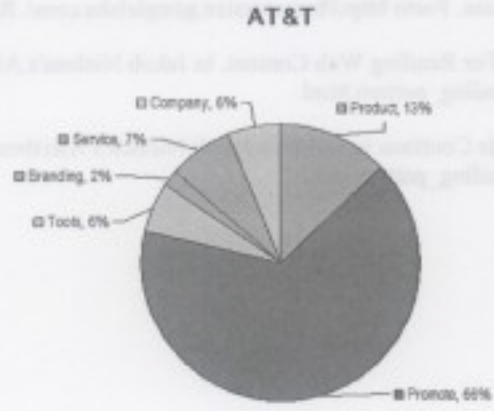


**Figure 6: Calculating AT&T website homepage**

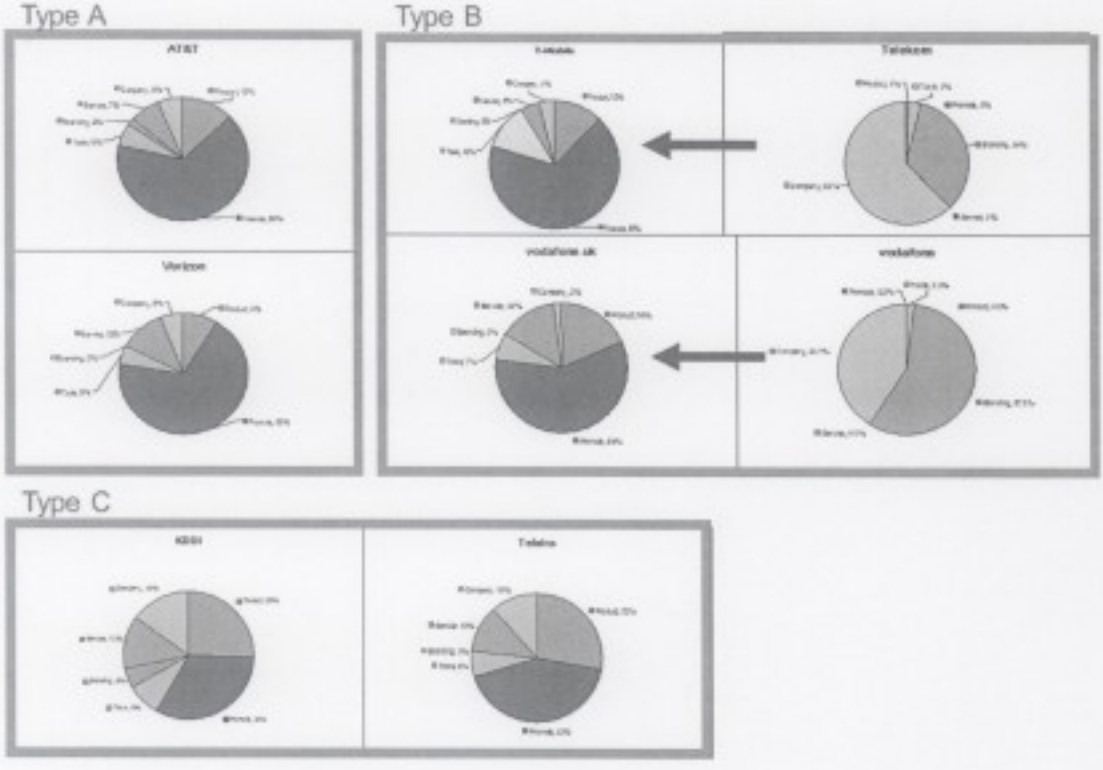


**Figure 7: Three homepage content strategies**

## REFERENCES

Bowden, A. (2009). Browser Size: a tool to see how others view your website. From http://googleblog.blogspot.com/2009/12/browser-size-tool-to-see-how-others.html. Retrieval at 2010-10-10

Duchowski, A. T. (2007). Eye tracking methodology: Theory and practice: Springer-Verlag New York Inc.

Eyetools. (2006). Google Search's Golden Triangle. from http://eyetools.com/research_google_eyetracking_heatmap.html

Georg, B., Edward, C., & Meredith Ringel, M. (2009). What do you see when you're surfing?: using eye tracking to predict salient regions of web pages. Paper presented at the Proceedings of the 27th international conference on Human factors in computing systems.

Google, Inc. (2009). Google browser size. Form http://browsersize.googlelabs.com/. Retrieval at 2010-10-10

Nielsen, J. (2006a). F-Shaped Pattern For Reading Web Content. in Jakob Nielsen's Alertbox. Available in http://www.useit.com/alertbox/reading_pattern.html

Nielsen, J. (2006b).Will Plain-Text Ads Continue to Rule? in Jakob Nielsen's Alertbox. Available in http://www.useit.com/alertbox/reading_pattern.html

# A Study of the Linkage of XML-related Library Science Curricula and Professional Qualification

**Yuhui Huang**
Graduate Institute of Library & Information Studies
National Taiwan Normal University, Taiwan
{Email: 095153118@ntnu.edu.tw}

**Naicheng Chang**
Assistant Professor
General Education Center
Tatung University, Taiwan
{E-mail: ncchang@mttu.edu.tw}

## ABSTRACT

This study investigates the current XML-related courses available in 96 library and information schools with English websites from 207 library and information schools in South East Asia and Taiwan's nine library and information schools by browsing their websites. Also, the study distributes an English questionnaire to the 96 library and information schools to confirm their XML-related courses. A research questionnaire to Taiwan's library and information school graduates who took XML-related courses and graduated from 2001 to 2009 and left library and information school at least two years ago, requesting their views on XML-related courses. In-depth interviews were carried out with randomly selected ten volunteer respondents who had returned questionnaires. Through the research the study investigates the linkage of library and information school graduates who studied different levels of XML-related education and their professional qualifications.

## INTRODUCTION

The Extensible Markup Language (XML) (Bray et al., 1998) has become the markup language which is most often used to create, archive and disseminate digital information on the Web. A variety of Web applications and industry initiatives have announced their support for XML. When the Library of Congress proposed the ten challenges of establishing digital libraries in the 21st century, they discovered that metadata is the key challenge (Library of Congress, 1998). Anderson (1999) at the Library of Congress pointed out clearly that interoperability and metadata are the most important factors in the construction of digital libraries. Chang's research (2006) showed that XML and XML-family-based technical construction can solve the challenges of metadata and interoperability of digital library.

The Association of Research Libraries (ARL) explored the professional qualifications of library and information specialists and indicated that mark-up languages such as XML was one of the core professional abilities (Simmons-Welburn, 2000). The Association for Library Collections and Technical Services (ALCTS) (2003) conducted a survey and discovered that 73% of respondents thought that cataloguers needed knowledge of XML. The Library & Information Technology Association (LITA) (2010) points out Top Technology Trends which librarians need to monitor closely, and it is noteworthy that one third of these are technologies closely related to XML initiatives. The UK Chartered Institute of Library and Information Professionals (CILIP) (2010) have covered XML in their training courses as one of

the core skills. Chang (2006) found the XML message has been heard in the LIS courses in the United States and the United Kingdom.

This study investigates the linkage of library and information school graduates who took different levels of XML-related education (that is XML arranged as an individual course or XML arranged as a section unit in LIS courses) and their professional qualification. This study will provide our library and information schools and associations with the necessary information to take into account the needs of library and information schools in their curricula and to plan our future XML-related courses and provide directions for the planning for continuing education for librarians.

## RESEARCH DESIGN

This study applies three research methodologies described below.

### Information gathering from the internet

This investigates the current XML-related courses available in 96 library and information schools with English websites from 207 library and information schools in South East Asia and Taiwan's nine library and information schools by browsing their websites. Also, the study distributed an English questionnaire to the 96 library and information schools to confirm their XML-related courses.

### Questionnaire surveys

A research questionnaire with a total of 16 questions was sent to Taiwan's library and information school graduates who took XML-related courses and graduated from 2001 to 2009 and left library and information schools at least two years ago, requesting their views on XML-related courses. The questions were organized into three categories:

1) Degree of XML-related courses satisfaction (question A1-A7);

2) Cognition of learning XML technology (question B1-B4); and

3) Views of XML-related courses (question C1-C5).

The questionnaires were circulated through nine library and information schools in Taiwan and the Google web questionnaire platform. The questionnaires were post on Facebook, Plurk and Taiwan's biggest BBS website PTT; also, they were circulated via authors' personal contacts. Total 1,345 questionnaires were sent out and 151 of valid questionnaires were returned.

### In-depth interviews

These were carried out via telephone and MSN online conversation with randomly selected ten respondents who had returned questionnaires and expressed their willingness to volunteer further contact. The background of the respondents includes finance staff, database salesman, reference librarian, high school information staff, system librarian, database system engineer, cataloging & acquisition librarian, and teacher of institute of technology.

**INITIAL RESULTS**

1. Through website investigation, we found that eight library and information schools in Korea, India, Thailand and Singapore provided thirteen XML-related courses (arranged as section unit in courses in bachelor level in Korea and in master level in the other three countries). Ten out of the thirteen courses have XML practical practice arrangements, and four of the thirteen courses are compulsory. In Taiwan, seven out of nine library and information schools provide eleven XML-related courses (one is arranged as an individual course in bachelor level and the others are arranged as section units in master level). Five of the eleven courses have XML practical practice arrangements, and one in the eleven courses is compulsory. Moreover, the Library Association of the Republic of China (Taiwan) has held 6 training courses containing XML-related sections since 2005; yet, library associations in India, Thailand and Singapore show no XML-related training courses, and Korean Library Association does not provide an English website, and so we have no knowledge of their training courses.

2. Results of the top two percentages found from questionnaire surveys are described below by category and displayed in Chart 1.

   (1) 49.23% of respondents had no opinion on whether teaching materials fit the course needs (A1), and 40.00% agreed they did fit the course needs. 52.31% of respondents had no opinion on whether teaching materials fit the students' ability and needs (A2), and 32.31% agreed they did fit the students' ability and needs. 50.77% of respondents had no opinion on whether course arrangement makes it easier to learn XML (A3), and 26.15% agree it does make learning XML easier. There is the same percentage of 36.92% of respondents that had no opinion and those that agreed on whether learning XML enriches their professional qualification (A4). There is the same percentage of 35.38% on whether XML practical practice gives them more thorough knowledge on XML technology (A5). 46.15% of respondents had no opinion on whether the content of XML-related courses is sufficient for job needs (A6), and 30.77% disagreed on this question. 53.85% of respondents had no opinion on whether the XML-related courses fit graduates' job need and needs of pursuing higher education (A7), and 24.62% disagreed on this question.

   (2) 37.75% of respondents had no opinion on whether XML is one of LIS specialists' professional qualifications (B1), and 35.76% agreed XML is one of LIS specialists' professional qualifications. 38.41% of respondents had no opinion on whether XML knowledge is useful for future jobs (B2), and 32.45% agreed on this question. 33.77% of respondents thought XML ability is one of their strong points in getting a job (B3), and 29.14% had no opinion on this question. 35.10% of respondents disagreed that knowledge of XML technology is required for their present and old jobs (B4), and 29.14% had no opinion on this question.

   (3) 39.07% of respondents agreed that XML should be arranged as an individual course (C1) and 40.4% thought XML should be provided in bachelor level (C2); whereas, 29.14% and 32.45% had no opinion on the two questions respectively. 39.74% of respondents had no opinion on whether XML should be arranged as a compulsory course (C3), and 27.15% thought it should. 39.74% of respondents thought that XML courses should contain practical practice (C4), and 33.11% of respondents even strongly agreed on this question. 41.06% of respondents showed interest in attending continuing education on XML-related courses organized

by library associations (C5), and 21.85% had no opinion on this question.

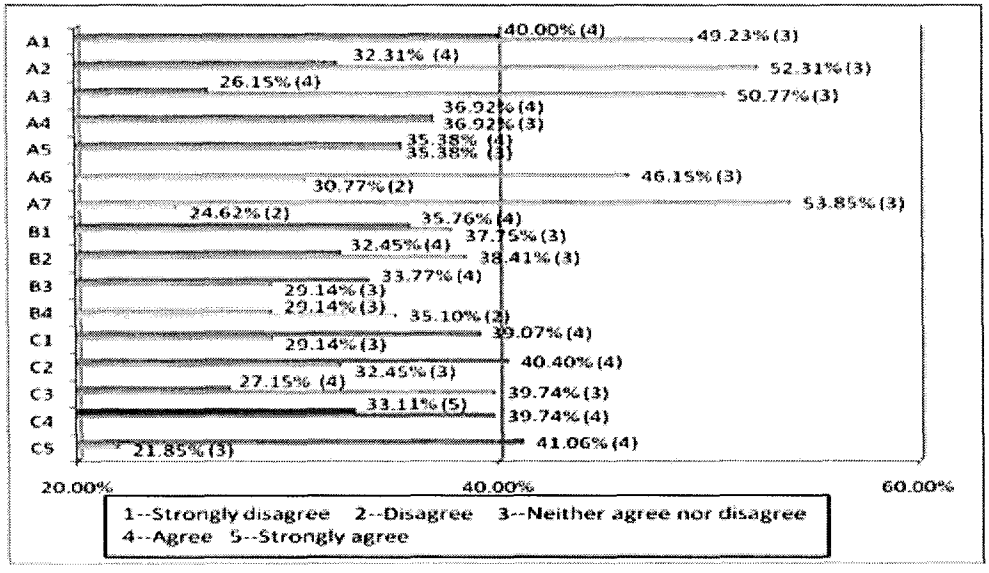


**Chart 1: Views of XML technology and XML-related courses**

3. Results found from in-depth interviews are described below by category

In general, interviewees were not happy with the XML-related courses. They thought XML teaching materials did not fit course needs or students' ability and needs. Two of the interviewees with job as database analysis and lecturer of polytechnic institution even learnt more knowledge of XML by self-study and taking more courses provided by organizations. Interviewees in general thought XML technology is one of LIS specialists' professional qualifications, particularly for those who wished to have jobs in the information-related marketplace. For those who wished to work in management area in libraries, basic XML knowledge is sufficient. Those interviewed all thought that practical practice sessions were necessary in courses and had differing views on whether it should be an individual course or a section of an LIS course. One third of interviewees thought XML should be arranged as an individual course in order to obtain good learning outcomes, and the remaining one third of interviewees thought it was fine to arrange XML technology as section unit in LIS courses. And the rest one third of interviewees thought if there were learning tracks organized by library and information schools, for track in information technology, XML should be arranged as an individual and compulsory course, and should contain practical practice. All the interviewees thought XML practical practice was required no matter whether it was arranged as an individual course or as a section unit in LIS courses.

## CONCLUSION AND RECOMMENDATIONS

Compared to the library and information schools in South East Asia, library and information schools in Taiwan provide more XML-related courses but less practical practice sessions in those XML-related courses than in eight library and information schools in Korea, India, Thailand and Singapore. The Library Association in Taiwan provides XML-related courses, and this is not found in the library associations in the above mentioned four countries.

In general, we discovered that those interviewed had the same views as the questionnaire respondents. In category A,

although more percentages of respondents have no opinion in most questions, there are still more than one third of respondents in agreement with the questions in this category. Except that respondents who are in an information-related field think the content of XML-related is not enough for their job needs or fits graduates' job needs. This shows that XML has been needed more for computing technicians than for the managerial level. In category B, the top percentage of respondents think XML ability is one of their strong points in getting a job. This could be that institutions look for candidates who are innovative, have knowledge of new trends and ability to learn and apply new technologies to improve work operations and ability to meet professional standards. And because most LIS graduates are in library management, more respondents think that knowledge of XML technology is not required for their present and old jobs. Also, this could be because XML is transparent to their work; therefore, they think XML is not required to their work. It is interesting to find that most respondents agree to questions in category C, and it is noteworthy that more than 70% of respondents agree or strongly agree that XML courses should contain practical practice arrangements.

XML with its structured document representation can bring advantages for digital library procedures and services in a digital environment. We conclude that although XML has not been well recognized as a core skill in library jobs or as part of the core programme in library and information schools; nevertheless, library associations in the United States and the United Kingdom have clearly exposed the key role of XML. Library and information schools should consider providing more optional XML-related courses with practical practice sessions, and library associations should provide regular XML-related continuing education to enhance LIS students' professional qualification.

## ACKNOWLEDGEMENT

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## REFERENCES

ALCTS Continuing Education Task Force (Action Item 5.3). (2003). *Cataloging for the 21st Century: a Proposal for* Continuing Education for Cataloging Professionals. [online]. Retrieved September 9, 2010, from https://scholarsbank.uoregon.edu/dspace/bitstream/1794/986/1/CETF_Final_Report.pdf

Anderson, Martha. (1999). A Tool for Building Digital Libraries. *D-Lib Magazine*, 5(2). Retrieved September 11, 2010, from http://www.dlib.org/dlib/february99/02journalreview.html

Bray, Tim. et al., editors. (1998). Extensible Markup Language (XML) 1.0, W3C Recommendation. Retrieved September 11, 2010, from http://www.w3.org/TR/REC-xml/

Chang, Naicheng. (2006). The Impact of XML in Digital Library Development. PhD thesis, University of London.

Chartered Institute of Library and Information Professionals (CILIP). (2010). Retrieved September 11, 2010, from http://www.cilip.org.uk/default.cilip

Library & Information Technology Association. (2010) Top Technology Trends by Topic. Retrieved September 9, 2010, from http://www.ala.org/ala/lita/litaresources/toptechtrends/toptechtrends.cfm

Library of Congress. (1998). Challenges to Building an Effective Digital Library. Retrieved September 9, 2010, from http://lcweb2.loc.gov/ammem/dli2/html/cbedl.html

Simmons-Welburn, Janice. (2000). *Changing Roles of Library Professionals*. Dupont, Washington, D.C., pp.9-19.

# Digital Library with Reader Knowledge Archiving and Sharing Mechanisms for Promoting Reading Learning Performance

**Chih-Ming Chen, Yong-Ting Chen, Wei-Min Fan, Jhih-Hao Wu**
Graduate Institute of Library, Information and Archival Studies
National Chengchi University, Taiwan
{E-mail: chencm@nccu.edu.tw; puddingchen.35@gmail.com;
peegrayjames@gmail.com; ponzmanman@gmail.com}

## ABSTRACT

This work presents a reading annotation and knowledge sharing tool, which can annotate a web page with HTML format archived by the Taiwan libraries' history digital library based on Web 2.0 technologies. This work annotates HTML webpages archived by the Taiwan Library History Digital Library based on Web 2.0 technologies using a novel annotation and knowledge-sharing tool. A quasi-experimental design method was employed to randomly assign participants to an experimental group and control group to evaluate differences in the reading performance of learners who used the proposed annotation system. A statistical analysis scheme was employed to evaluate differences in learning performance of learners while reading and learning with the proposed annotation tool. This work shows how the annotation tool benefits the growth of digital archives and promotes learning performance. The proposed annotation and knowledge-sharing tool can accumulate and share the knowledge of readers who participate in reading and/or learning processes in the digital library. Most importantly, the annotated content helps new readers understand articles and helps readers who have read an article obtain a deeper and broader understanding than when reading digital content without annotations.

## INTRODUCTION

Collecting content for DLs is the most important and difficult step in developing rich digital content. Recently, Web 2.0 technologies have enable the contribution of user-generated content to DLs and developing new applications with Web 2.0 technologies in a library setting is becoming an important research issue. Curran *et al.* (2007) noted that user-generated content, as opposed to content posted solely by site author(s), and treating users as co-developers of a site are features of Web 2.0 websites. Wikipedia is the most well-known site for user-generated content. Wikipedia, the largest multilingual free encyclopedia on the Internet, allows any user to add content, and all content can be edited by any other user. The principles of Web 2.0 that are applicable to DLs are interactivity and the possibility for users to contribute content. Many studies have indicated that users can create additional information to digitalized objects in DLs. In developing Web 2.0 technologies to DLs, the Oregon State University libraries integrated Reference Desk Manager (RDM) with a Wiki to enhance their reference services (Frumkin, 2005). Based on a literature survey, Web 2.0 services that help users create strong relationships between users and a library are urgently needed.

At present, Wiki, blogs, social tagging, Really Simple Syndication (RSS), social networks, and annotations are the main Web 2.0 technologies that have high potential for application to DLs. In particular, few studies have applied annotation technology to print libraries or DLs. Readers typically annotate printed books as a routine part of their engagement with materials. Marshall (1997) proved that annotations in books are useful to subsequent readers. Traditionally, annotating printed books by pen is the most common method of recording book knowledge, but is disadvantageous to knowledge storage in computers, knowledge dissemination, and knowledge sharing via the Internet. In contrast, annotating digital documents via an annotation tool can overcome these shortcomings. Petri *et al.* (2005) categorized annotation systems as document-centered and discussion-centered systems. Discussion-centered systems provide tools for browsing and annotating discussions, while document-centered systems allow learners to browse and annotate web-based documents. Frumkin (2005) indicated that if users could leave comments or annotations on a finding aid—providing additional information related to materials—this practice would open the door to sharing research experience, facilitate collaborative research, and make it easy for future researchers to find materials they need in a particular collection. Additionally, many studies (Ovsiannikov *et al.*, 1999; Petri *et al.*, 2005; Rau *et al.*, 2004; Hwang *et al.*, 2007) demonstrated that applying annotation tools to aid learning promotes learning performance. Constructing rich digital content and users leaving knowledge in DLs via annotations are important research issues.

This work presents a novel Web 2.0–based reader knowledge archiving and sharing tool. By using this tool, readers can conveniently add annotations to archived digital materials in Taiwan library history DL. The functionalities of the proposed annotation tool allow readers to add explanations, synonyms, comments, and hyperlinks for marked target areas, and underline paragraphs as important sections as well as rate annotations from other users. With the proposed annotation tool, annotations for archived digital material can be accumulated continuously by readers annotating the material. A digital material archive with rich annotation information can increase the reading comprehension of first-time readers as well as promote deep reading for readers who have read the material. Moreover, annotation information also promotes reading efficiency because some additional comments attached to the digital material provide meaningful and interpretive information that can shorten reading comprehension time. In conclusion, this work explores the effects of cooperative annotation—its value to annotators and subsequent readers—and the impact of this practice has on the Taiwan library history DL.

## TAIWAN LIBRARY HISTORY DIGITAL LIBRARY WITH THE ANNOTATION TOOL FOR ARCHIVING AND SHARING READER KNOWLEDGE

This section describes in detail the system architecture of the proposed Taiwan library history DL with the annotation tool for archiving and sharing reader knowledge.

### System Architecture

Figure 1 presents the system architecture of the proposed annotation tool in the Taiwan library history DL for archiving and sharing reader knowledge. The proposed DL with the user annotation tool consists of the Taiwan library history DL, the annotation module, an annotation interface, and two databases. The DL provides materials readers browse, search, read, and annotate. The annotation service module integrates original material archived in the DL with annotations from readers to form new DL material with additional information and/or contexts. To

avoid destroying the original version of archived materials, the annotation service module uses an independent annotation database, which differs from the DL database, to store annotated information and contexts from readers. Moreover, the annotation interface provides several powerful annotation functionalities, such as annotating key paragraphs in a text via underlining, explaining unknown terms, providing comments on marked words or sentences, and assigning hyperlinks to marked words or sentences, to assist readers annotating an original archived material in the Taiwan library history DL. The annotation interface also has a knowledge-sharing interface that facilitates knowledge exchange among readers who read annotated materials in the DL.

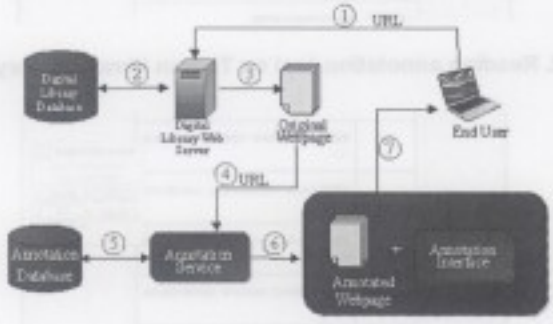



**Figure 1. System architecture of the proposed annotation tool on Taiwan library history digital library**

**The Functionalities of the User Annotation Tool in the Taiwan Library History Digital Library for Archiving and Sharing Reader Knowledge**

Figure 2 shows the proposed reading annotation tool in the Taiwan library history DL. To avoid interference with usage of the DL, the annotation tool can be hidden as a small icon located in the upper-right portion of the screen when no annotation is needed. If a reader wants to know which words are annotated on a digital material, they can select the "browser" menu, which highlights all words in the annotation. Figure 3 displays the highlighted target areas with annotations. Additionally, users must first register to become legal users via a registration wizard before using the reading annotation tool. Once a user logs on to the annotation tool, he/she will be able to use all annotation functionalities, including highlighting and adding comments. That is, users can annotate digital material in the Taiwan library history DL by highlighting and commenting on selected target areas. Figure 4 shows the menu for selecting an annotation type to annotate a selected target area. To annotate a selected target area, a user can select various annotation types, including explanation, synonym, comment, hyperlink, and underline. Users can browse all annotations for digital material on the DL. A target area with multiple annotations is open, allowing users to communicate asynchronously for sharing knowledge via annotations. Therefore, each annotation can be shared by all system users, and clicking on an annotation provides detailed information such as annotation author, rating result, and comments.

Moreover, users can also edit their own annotations; that is, annotations generated by other users cannot be edited, they can only be given a rating. Rating an annotation is helpful in identifying high-quality annotations. The proposed annotation tool can display annotated content with the highest ratings when a mouse stays on a selected target area with an annotation. Of course, users can also click on a selected target area with annotations when browsing annotations from all readers. Finally, users can also provide summary comments and rate the quality level

for annotated digital materials on the Taiwan library history DL.

**Figure 2. Reading annotation tool on Taiwan library history digital library**

**Figure 3. Highlight for all target areas with annotation**

**Figure 4. Selecting an annotation type for annotating a selected target area**

## ASSESSING THE ENHANCEMENT OF READING PERFORMANCE

The work conducted an experiment to assess whether the Taiwan library history DL with the proposed annotation tool is superior to the Taiwan library history DL without the proposed annotation tool in terms user reading performance. In this experiment, 70 undergraduates studying at National Chengchi University were invited to participate. Among the 70 undergraduates, 35 served as the control group and used the Taiwan library history DL without the proposed annotation tool; the remaining 35 students served as the treatment group and used the DL with the proposed annotation tool. Both groups completed a pretest and post-test for comparing differences in reading performance before and after learning. In this experiment, a subject related to "Taiwan library personnel" on the Taiwan library history DL was selected as the reading target. Before learning, all participators were invited to write a report based on prior knowledge of the selected subject. Next, the two groups began the reading activity to understand the history of Taiwan library personnel based on the digital content archived in the Taiwan library history DL. After learning, all participants were

invited to revise their reports finished during the pre-test as their reading outcomes. The finished reports were evaluated by the course instructor. Table 1 shows descriptive statistics of learning performance for both the control and treatment groups.

First, the independent samples t-test was applied to assess whether prior knowledge of two participating groups for "Taiwan library personnel archived in the Taiwan library history DL was equivalent before the experiment based on pre-test results. Analytical results indicate that pre-test scores for these two groups did not differ significantly (Sig. =0.2006>0.05). Therefore, prior knowledge of two participating groups can be viewed as equivalent before the experiment. Next, post-tests of the two participating groups were also analyzed using the independent samples t-test. The t-test result (Sig. =0.0424<0.05) shows that the post-test scores of the treatment group were significantly higher than those of the control group. Moreover, this study further compared pre-test and post-test scores for each group using the paired samples t-test. Analytical results for the control group indicate that the difference in mean pre-test and post-test scores is –1.56, and the paired samples t-test result reaches the significance level (Sig. =0.022<0.05). Additionally, the pre-test and post-test scores for the treatment group were also assessed using the paired samples t-test. Analytical results indicate that the difference mean pre-test and post-test scores is –2.96, and the paired samples t-test result (Sig. =0.000<0.05) shows that the treatment group also achieves significant difference. Experimental results show that both groups had improved learning performance, but the treatment group improved more than the control group.

**TABLE 1. THE DESCRIPTIVE STATISTICS INFORMATION OF READING LEARNING PERFORMANCE FOR BOTH THE CONTROL AND TREATMENT GROUPS**

| Comparison item / Learning mode | Pre-test | | | Post-test | | |
|---|---|---|---|---|---|---|
| | Number of Learners | Mean | Std. Deviation Mean | Number of Learners | Mean | Std. Deviation Mean |
| The control group performed the reading learning without the support of the reading annotation tool | 35 | 75.57 | 4.31 | 35 | 77.13 | 4.16 |
| The treatment group performed the reading learning with the support of the reading annotation tool | 35 | 76.41 | 4.86 | 35 | 79.37 | 5.02 |

## CONCLUSIONS AND FUTURE WORK

Popular research on DLs mainly focused on organizing and accessing information, and most ignored the importance of archiving reader knowledge. Since reader knowledge cannot be immediately stored and efficiently managed, DLs lose a large amount of useful reading outcomes and processes from readers who use DLs. Thus, reader knowledge cannot be applied or efficiently shared thorough DLs or the Internet. Therefore, this work presented a novel tool for archiving and sharing reader knowledge that allows readers to easily annotate digital materials in HTML in the Taiwan library history DL, thereby enabling cooperative knowledge creation. Experimental results show that the proposed archiving and sharing tool effectively gathers reader knowledge via user participation. Compared to the original digital material without annotations, digital material with annotations, such as explanations, user comments, and rich contexts associated with digital materials, is very useful to readers. The values to those annotating and subsequent readers are the acquisition of

deep knowledge and increased reading efficiency. Furthermore, the implications of the work are that DL content grows dynamically as readers contribute knowledge, thus assisting in the development of a reading community on DLs. A more important issue is that annotated information from different readers has very high potential for value-added reading knowledge utilizing data mining techniques.

Although this work has presented several implications of the proposed tool for archiving and sharing reader knowledge in DLs, several other issues warrant further investigation.

(1) Categorizing annotations as public and private will be a significant issue in the future. Public annotations are for sharing knowledge, and private annotations can preserve personal reading outcomes for knowledge management.

(2) Providing a discussion board for comments or replies to annotations from readers can increase interaction among readers. This would also prove helpful in creating a learning community for a DL.

(3) Ming reading knowledge based on reader annotations with ratings is a potentially fruitful research direction.

(4) The Taiwan library history DL with the proposed annotation tool may benefit e-learning.

## REFERENCES

Curran, K., Murray, M., and Christian, M. (2007). Taking the information to the public through Library 2.0. *Library Hi Tech*, 25(2), 288-297.

Frumkin, J. (2005). The Wiki and the digital library. *OCLC Systems & Services*, 21(1), 18-22.

Goh, D. H. L., Chua, A., Khoo, D. A., Khoo, E. B. H., Mak, E. B. T., Ng, M. M. (2006). A checklist for evaluating open source digital library software. *Online Information Review*, 30(4), 360-379.

Hwang, W., Wang, C., and Sharples, M. (2007). A study of multimedia annotation of Web-based materials. *Computers & Education*, 48(4), 680-699.

Jody L. D. (2007). Choosing software for a digital library. *Library Hi Tech News*, 24(9/10) , 19 - 21.

Marshall, C. (1997). Annotation: from paper books to the digital library. *Proceedings of the Second ACM Conference on Digital Libraries*, Retrieved April 1, 2010, from http://csdl.tamu.edu/~marshall/dl97.pdf

Ovsiannikov, I. A., Arbib, M. A., and McNeill, T. H. (1999). Annotation technology. *International Journal Human-Computer Studies*, 50(4), 329-362.

Petri, N., Miikka M., Jaakko K., Patrik F., & Henry T. (2005). A shared document-based annotation tool to support learner-centred collaborative learning. *British Journal of Educational Technology*, 36(5), 757-770.

Rau, P. L. P., Chen, S. H., Chin, Y. T. (2004). Developing web annotation tools for learners and instructors. *Interacting with Computers*, 16(2), 163-181.

Tansley, R., Bass, M., Stuve, D., Branschofsky, M., Chudnov, D., McClellan, G., Smith, M. (2003). The DSpace institutional digital repository system: current functionality. *Proceedings of the 3rd ACM/IEEE-CS Joint Conference on Digital Libraries*, 87-97.

# A Study of Knowledge Transfer in the Knowledge Community

**Yi-Wen Wang**
Graduate Student
Tamkang University, Taiwan
{Email: palpink@hotmail.com}

## ABSTRACT

Arthur Anderson Business Consulting (2001) referred the best solution for enterprises to be able to react to the rapid change of the market and be on top of the competition is to carry out knowledge management (KM). Knowledge management is to integrate the internal and external resources of the enterprise, preserve and reuse the important intelligent assets to enable the enterprise to transform into a learning organization, and to assist the enterprise to face the threat of the changing environment, so that the enterprise can get hold of opportunities of new production and service developments.

Implicit knowledge is the most critical source of the organizational knowledge (Wang, Chao, & Yang, 2004). However, it is difficult to extract and preserve implicit knowledge because of the difficulties of tacit knowledge transfer and sharing. It is not easy for members of an organization to share knowledge in the same way as what they do in the day-to-day communication. In addition, some of these hurdles are personal, they are by-and-large the result of a set of organizational structures, management practices, and evaluation systems that discourage— rather than encourage— sharing.

From the perspective of library and information science, the research focuses on the relation of knowledge management, knowledge transfer, and knowledge communities. This research proposes to understand the methods of knowledge transfer and methods of knowledge organization of knowledge communities within an organization. A case study approach will be adopted to understand how an advertising industry transfers their knowledge. It is expected that the identified practice of knowledge transfer of knowledge communities can be used in other types of organizations. Libraries and museums may adopt the model of knowledge transfer in the advertising company to enrich the KM practice. In addition, new service opportunities for libraries and information centers could also be provided with the understanding of knowledge transfer in knowledge communities.

## INTRODUCTION

Arthur Anderson Business Consulting (2001) referred the best solution for enterprises to be able to react to the rapid change of the market and be on top of the competition is to carry out knowledge management (KM). Knowledge management is to integrate the internal and external resources of the enterprise, preserve and reuse the important intelligent assets to enable the enterprise to transform into a learning organization, and to assist the enterprise to face the threat of the changing environment, so that the enterprise can get hold of opportunities of new production and service

developments.

Implicit knowledge is the most critical source of the organizational knowledge (Wang, Chao, & Yang, 2004). However, it is difficult to extract and preserve implicit knowledge because of the difficulties of tacit knowledge transfer and sharing. It is not easy for members of an organization to share knowledge in the same way as what they do in the day-to-day communication. Even when people can share tacit knowledge, the speed is very slow and the cost for knowledge transfer is high (Wu & Zhou, 2004). In addition, some of these hurdles are personal, they are by-and-large the result of a set of organizational structures, management practices, and evaluation systems that discourage— rather than encourage— sharing. To tell people share without first addressing systemic obstacles would only lead to disappointment and failure (O'Dell & Grayson, 1998).

In recent years, the cultural and creative industry (C&C industry) receives much attention from countries around the world. The definitions of the cultural and creative industry are slightly different from country to country. In Taiwan, advertising companies, libraries, and museums all belong to the cultural and creative industry. Among the different types of organizations in the C&C industry, the advertising company is presumably the one with most creative ideas and thus most implicit knowledge. The purpose of this study is to identify the method and process of knowledge transfer of knowledge communities within an organization of the advertising industry. It is expected that the identified practice of knowledge transfer of knowledge communities can be used in other types of organizations in the C&C industry. Libraries and museums who are also in the same industry may adopt the model of knowledge transfer in the advertising company to enrich the practice in their own organizations. In addition, new service opportunities for libraries and information centers could also be provided with the understanding of knowledge transfer in the knowledge community. The study has the following research questions:

1. What are the needs of sources of knowledge in the advertising industry?
2. What kind of knowledge communities are included in the advertising industry?
3. In the advertising industry, how knowledge is transferred in the knowledge communities?

## RELATED LITERATURE

### Knowledge Management

Since the 1990s, the term knowledge management has become influential in both the academic community and in the industries. Before then, knowledge management (KM) is just a concept. Skills and techniques of many how-tos within an organization were shared by experiences, ideas, knowledge, and wisdom through word of mouth or apprenticeship, which are all methods of knowledge management.

In the knowledge economy, the survivability of an organization depends on its ability of managing explicit as well as implicit knowledge. Many scholars proposed the definition of KM. In this research, KM is defined as systematically creating knowledge, identifying knowledge, collecting knowledge, organizing knowledge, sharing knowledge, and using knowledge for the benefit of the organization. The goal of continuing KM is to create a niche, preserve the memory of the organization, and get the right knowledge to the right people at the right time to enhance

the company performance.

**Knowledge Community**

Communities refer to a group of people who share common interests (Botkin, 1999). Seaman (2008) believed when one shares commonality with others, communities are formed. Botkin (1999) pointed out sharing is a description of behavior, cooperation is a pattern of systematic sharing, and community is the organized use of cooperation. Thus, the members of community are based on the cooperation relationship, not only because of the sharing common interests, but also because of specific project and purpose. Seaman (2008) stated that different communities explore different commonalities and work in different ways. While no two communities are alike, some tend to take on similar characteristics in regard to their structure, operation, and goals. The goal of a community is to improve, including neighborhood development, public community service, or improvement of practice.

There are two important yet similar community theories: knowledge communities and communities of practice, with the same purpose of improving certain practice. You (2001) noted that in the knowledge community, employees are self-motivated or semi-voluntary to form knowledge-sharing groups. The relationship, the trust, the common interests, and the roles and responsibilities are not official. Communication and sharing is emphasized in the knowledge community or communities of practice, thus the purpose of knowledge community is to assist organizational knowledge to transfer, in order to achieve knowledge sharing and create efficiency for the organization.

Knowledge communities in business are groups of people with a common passion to create, share, and use new knowledge for tangible business purposes. In short, the knowledge community emphasizes knowledge sharing and addresses the barriers of knowledge flow within the organization. Good interpersonal relationships are key elements of a successful knowledge community, thus, communication is the basis of knowledge sharing in the community. There is no community without communications (Seaman, 2008).

There are the informal and often invisible communities that every company has (Botkin, 1999). However, not all communities can be defined as a community of practice, Wenger (1998) pointed out there are three major characteristics of communities of practice: the domain, the community, and the practice. Through a combination of these three elements a community of practice or a knowledge community can be built.

Knowledge community is not a general forum or group. Instead, community members have the same interests or goals. Fellow practitioners can share their experience and stories. The sharing and exchange of knowledge is carried out by the same tools and same language. Therefore, whether it is "knowledge community" or "communities of practice," these communities are formed based on knowledge sharing and take it as the core concept and activity of the group. In this proposed study, the researcher uses "knowledge community" to represent the core concept of the two community theories and defines the knowledge community as "a group of knowledge workers within an enterprises, through formal or informal organization and through various knowledge transfer strategies, to share implicit and explicit knowledge with each other, so that organizations can produce the greatest benefits."

### Knowledge Transfer

Nonaka and Takeuchi (1995) assumed that knowledge is crated through the interaction between tacit and explicit knowledge and developed four different modes of knowledge conversion, which are: socialization, externalization, combination, and internalization. Socialization is a process of sharing experience and thereby creating tacit knowledge, such as shared mental models and technical skills. Externalization is a process of articulating tacit knowledge into explicit concepts; it' a quintessential knowledge-creation process in that tacit knowledge becomes explicit, taking the shapes of metaphors, analogies, concepts, and hypotheses or models. Combination is a process of systemizing concepts into a knowledge system. This conversion model involves combining different bodies of explicit knowledge and emphasizes that internalization is a process of embodying explicit knowledge into tacit knowledge.

The concept of knowledge transfer is very close to that of knowledge sharing, which generally refers to through sharing and the internalization of knowledge among different people with different knowledge, greater value for the organization is produced (Lin, 2003). The difference is that knowledge transfer is initiated and generated by the organization's flow of knowledge, which usually has a specific knowledge recipient and provider, whereas knowledge sharing refers to the exchange of knowledge among internal and external staff of the organization with channels that are both formal and informal. Therefore, knowledge transfer is more formal and has a clear direction of knowledge flow; knowledge sharing emphasizes more on non-organization-led, mostly sporadic and relatively non-specific direction of knowledge flow.

## RESEARCH METHOD

In order to understand the knowledge sharing of knowledge communities, this study proposes to adopt the case study method. With in-depth interviews and observations, the case study can depict the phonemes being studied. The participants of the case can describe the ideas and thoughts in experienced situations of the participants' life ( Xu & Zhang, 2000).

In this study, an advertising company is chosen as the case company to examine how the organization transfers knowledge in its knowledge communities. There are two reasons for the selection of the case company. First, the chosen advertising company A is Taiwan's oldest advertising company, founded in 1970 with current employees of nearly 100 people. Therefore, effective knowledge sharing and transfer is very important for this company. Second, the studies of knowledge management in advertising industry in Taiwan are limited. There is, however, a lot of tacit knowledge in advertising industry that is hard to record and share. Therefore, it is expected that this research can help understand the method and practice of knowledge transfer in knowledge communities of advertising industry. It is hope that the results of the study can assist other relating industries to have a better understanding in this area. In addition, new service opportunities for libraries and information centers could also be provided with the understanding of knowledge transfer in knowledge communities.

## REFERENCES

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company.* New York: Oxford University Press.

O'Dell, C., & Grayson, C. J. (1998). If only we knew what we know: The transfer of internal knowledge and best practice.

New York: The Free Press.

Seaman, M. (2008). Birds of a feather: Communities of practice and knowledge community. In Stern, B. S. (Eds), *Curriculum and Teaching Dialogue.* (pp. 269-279). Charlotte, NC: Information Age Publishing.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* New York: Cambridge University Press.

王娟茹、趙高正、楊瑾 (2004)。隱性知識共享模型與機制研究。*科學與科學技術技術管理，25*(10)，64-67。

尤克強 (2004)。*知識管理與創新*。台北：天下。

伍曉玲、周明 (2004)。組織內部的知識移轉極其困難研究。*科學與科學技術管理，12*，68-71。

林東清 (2003)。*知識管理*。台北：智勝文化。

許言、張文智 (2000)。設計顧問公司的知識管理探討。*工業設計，32*(1)，11-18。

勤業管理顧問公司 (Arthur Anderson Business Consulting) 著 (2002)。*知識管理的第一本書：運用知識管理提升企業核心能力* (劉京偉譯)。台北：商周。(原作1999年出版)

# LOCATION & MAP

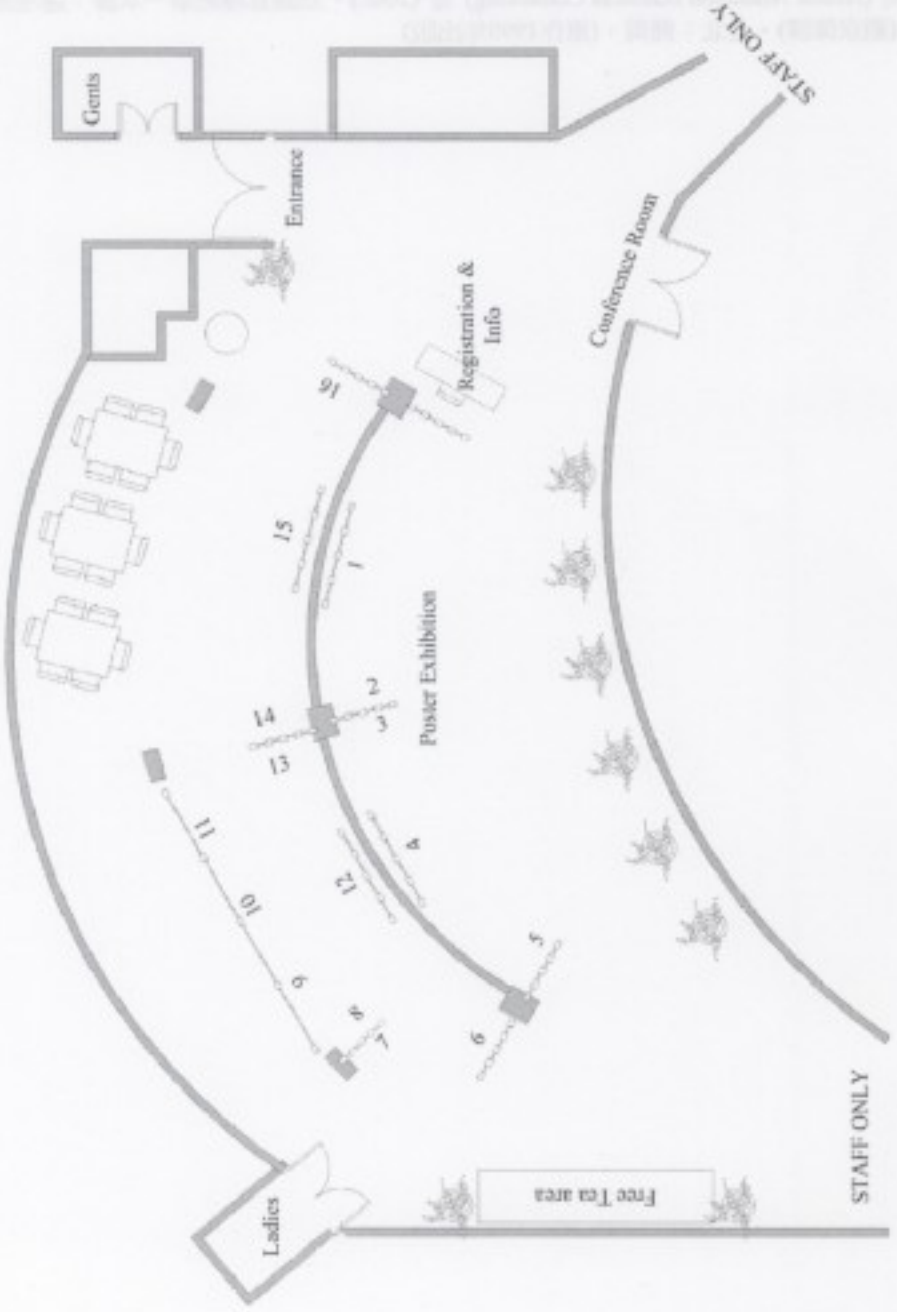
## Vanue

International Conference Hall of Main Library

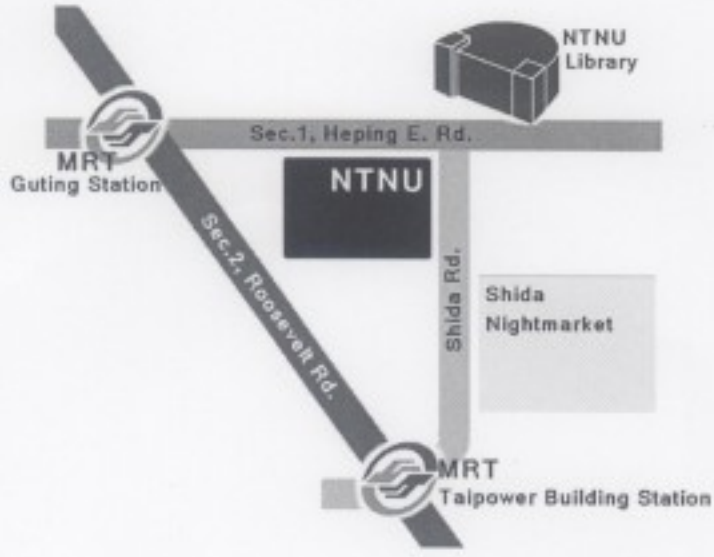
National Taiwan Normal University

129, Sec. 1, Hoping E. Rd., Taipei, Taiwan

## Conference Hall Plan



Direction Guide Map




國立臺灣師範大學圖書資訊學研究所 | Graduate Institute of Library & Information Studies, National Taiwan Normal University
Tel: +886-2-77345427 | Fax: +886-2-23518476 | Email : ntnuglis2010@gmail.com
台北市大安區和平東路一段162號
No.162, Sec. 1, Hoping East Rd., Da-an District, Taipei 10610, Taiwan

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