**SPECIAL SECTION**

**Institutional Repositories: The Great Debate**

11] **Introduction**  
Helen R. Tibbo, Rachael Green Clemens and Carolyn Hank

12] **Topic 1: All Universities Should Have an Institutional Repository**  
*Affirmative: Soo Young Rieh | Negative: Kevin Smith*

17] **Topic 2: Libraries Should Lead the Institutional Repository Initiative and Development at Their Institutions**  
*Affirmative: Jim Ottaviani | Negative: Carolyn Hank*

22] **Topic 3: Institutional Repositories Should Be Built on Open Source Software**  
*Affirmative: Paul Jones | Negative: Michael Day and Alexander Ball*

27] **Topic 4: Institutional Repository Success is Dependent Upon Mandates**  
*Affirmative: Steve Hamad | Negative: Nancy McGovern*

**FEATURES**

32] **Apple, IKEA and Their Integrated Architecture**  
David Potente and Erika Salvini

43] **Web 2.0 Applications of Geographic and Geospatial Information**  
Alan Oxley
To repository or not to repository – that is the question. Or, more precisely, that is one of four topics debated in our special section on institutional repositories, edited by Helen Tibbo, Rachael Clemens and Carolyn Hank from the University of North Carolina Chapel Hill. Apart from the issue of whether all institutions of higher learning should create repositories for their faculty and other constituencies, the other points debated are whether libraries should lead such efforts, whether repositories should be based on open source software exclusively and whether their success is dependent on mandates. The editors have found eight knowledgeable people in the field to debate both sides of these issues, although they add that some authors have been persuaded to provide a fair hearing for us on a position they may not hold themselves. In the course of the debate the authors provide a good sense of the current state of the repository movement and its major challenges and concerns.

We do not have an IA Column as such in this issue, but thanks to the efforts of Stacy Surla, our associate editor for IA, we do have an IA feature from the European IA Summit, held in Amsterdam in September 2008. Davide Potente and Erika Salvini, both then associated with the University for Foreigners in Perugia, Italy, present two case studies on how a company’s information architecture might be generalized to cover both its website and aspects of its retail stores, such as arrangement and signage. This integration provides a “bridge experience” for customers that can facilitate their frequent transitions from one environment to the other.

Our other feature article also concerns the relationship between the web (Web 2.0 in this case) and the physical environment. Alan Oxley discusses the use of geographic and geospatial information in Web 2.0 applications (tagging, mapping and mashups) along with such challenges as standards that support geographic and geospatial applications and the availability of geographic data to non-commercial users.

Finally, we include a What’s New? in this issue, with practitioner-oriented summaries of three recent JASIST articles, while ASIS&T’s Global Alliance is the subject of Don Case’s President’s Page.
The Global Alliance

For the last three years (and further back, in less formal terms), ASIS&T has pursued a policy of engagement with other associations and societies around the world. We call this project the Global Alliance of Information Sciences, Technologies and Services Societies, or simply the Global Alliance for short. The alliance hopes to create a space in which scholarly and professional societies can share information, conduct joint activities, facilitate international networking and jointly offer an attractive image to prospective entrants in the information professions.

Two practical outcomes of this initiative are that we are in the process of (1) creating an electronic means of sharing information on a regular basis and (2) seeking agreements with those societies desiring to establish reciprocal member rates at each other’s conferences.

The point person (that is, the president or representative thereof) for each society is someone who is multilingual. In the case of ASIS&T our representative has been Michel Menou.

During the year, I will be introducing the ASIS&T membership to various of these partners. One sister society in the Global Alliance is the Asociación de Educación e Investigación en Ciencia de la Información de Iberoamérica y el Caribe / Associação de Educação e Investigação em Ciência da Informação da Iberoamérica e Caribe (EDIBCIC).

An approximate English translation of EDIBCIC’s full name would be the Iber-American and Caribbean Association for Education and Research in Information Sciences, Library Technology, Archives and Documentation. It is recognized by UNESCO as a key coordinating agency for Spanish- and Portuguese-speaking information scientists.

EDIBCIC was created in 1996. The association came about through meetings among educators and researchers in the information sciences during the 1990s. They came together to exchange ideas and experiences with the intention of integrating and consolidating learned societies and interests in information science.

EDIBCIC has active membership from 17 countries in Latin America and Europe, including Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru, Portugal, Puerto Rico, Spain and Uruguay. These countries are organized into four geographic regions: Andean, Mercosur, Caribbean and Spain-Portugal. In May 2008 the Spain-Portugal group organized a meeting regarding research, education and jobs in the information professions that paved the way for systematic cooperation among the LIS schools in those two countries. EDIBCIC has held meetings in Puerto Rico (1993, 1996), Mexico (1995, 2008), Venezuela (1998), Spain (2000), Argentina (2004) and Brazil.
EDIBCIC was created in 1996.
The association came about through meetings among educators and researchers in the information sciences during the 1990s.

(2006). Both the proceedings of these meetings and a comprehensive listing of LIS programs and publications of Latin America resulting from a European Union Alfa project led by Ian M. Johnson of the University of Aberdeen, United Kingdom, are available on the EDIBCIC website.

The association has a number of working groups, including members interested in infometrics, the organization of knowledge, the growth of knowledge, international relations, information and communication technologies, archives, professional development and labor market and information literacy, among others.

The immediate past president, Professor Elias Sanz Casado, attended the ASIS&T Annual Meeting in Columbus in November of 2008. He is a faculty member in the Departamento de Biblioteconomía y Documentación of the Universidad Carlos III de Madrid in Spain. The incoming president is Professor Roberto Garduño Vera of the Centro Universitario de Investigaciones Bibliotecológicas (CUIB), Universidad Nacional Autonoma de México. The vice president is Professor Marta Lígia Pomim Valentim of the Information Science Department of the Universidade Estadual Paulista, in Marília, Brazil. The EDIBCIC secretary is Professor José Antonio Frias Montoya of the Librarianship and Documentation Department of the University of Salamanca, Spain.

We are pleased to welcome EDIBCIC as one of the members of the Global Alliance.
We live in a culture where countries, organizations and individuals have never been so closely linked politically, economically and socially, linkages that are founded on rapid and efficient information transfer and access. Yet we also co-exist in a world that displays its rich cultural diversity and relies upon information sharing to reinforce its plurality. The 2009 ASIS&T Annual Meeting will offer participants the opportunity to explore how information research and practice can promote global communication while maintaining diversity.

To further support the point of our global dependence, the 2009 meeting will take place in Vancouver, BC, Canada, November 6-9.

The following are among the many topics expected to be addressed in papers, posters and panel sessions:

- Multilingual information systems
- Cross-language information retrieval
- Accessibility and cultural factors in system design
- Processing logographic, syllabic and alphabetic scripts in a digital environment
- Cross-border data flows
- Open access and cultural diversity
- Information literacy and challenges of harmony versus hegemony
- The role of international organizations in building on diversity
- Digital inclusion
- Social networking in a linguistically and culturally rich environment

Conference Committee
Conference chair Andrew Large, McGill University, has assembled a diverse committee to help plan the 2009 Annual Meeting. Among the committee members are France Bouthillier, McGill University, and Corinne Jorgensen, Florida State University, contributed papers co-chairs; KT Vaughan, University of North Carolina, and Pascal Calarco, University of Notre Dame, panels and technical session co-chairs; Heidi Julien, University of Alberta, and Valerie Nesset, State University of New York at Buffalo, posters co-chairs; Karen Fisher, University of Washington; Grant Campbell, University of Western Ontario; June Abbas, University of Oklahoma; Luanne Freund, University of British Columbia; Sandra Hirsh, Microsoft Corporation; and Tao Jin, Louisiana State University.

Conference Venue
The 2009 ASIS&T Annual Meeting will be headquartered at the Hyatt Regency Vancouver.

The International Calendar of Information Science Conferences (http://icisc.neasist.org/) is a nonprofit collaboration between the Special Interest Group/International Information Issues (SIG/III) and the European (ASIST/EC) and New England (NEASIST) chapters of the American Society for Information Science and Technology, with the additional support of Haworth Press.
Robert S. Taylor, dean emeritus of the Syracuse University School of Information Studies (iSchool), passed away Thursday, January 1, 2009, at the Francis House in Syracuse after a lengthy illness. He was 90.

Robert Taylor served as president of ASIS&T in 1968 and was the recipient of the 1992 Award of Merit and the 1972 ASIS&T Best Information Science Book Award for *The Making of a Library*.

He served as dean of the Syracuse University School of Information Studies from 1972 to 1981. One of his most memorable accomplishments at the school was changing its name from library science to the more comprehensive information studies. “The change in name is not a cosmetic cover, but a recognition that the activities and courses we presently have can no longer be called library science,” he said at the time. “Simply put, ‘information studies’ better represents what we are doing and the direction we are going.”

Reflecting on the decision to change the school’s name, Taylor said in July 2007 that he accepted the deanship at Syracuse with the hopes of creating a new kind of school focused specifically on information. “I came here to Syracuse because this was the one library science school in the country that had a potential – a real potential – for change,” he said. “I wanted the word information in there so eventually we arrived at information studies – ambiguous enough to cover almost anything, as it has.”

Taylor also credited the late Raymond F. von Dran (dean from 1996-2007) with carrying out the vision he had for the field back in 1974. “Ray has truly given body to my dreams and I thank him,” he said during a memorial celebration for von Dran in July 2007.

Taylor founded the nation’s first master’s degree in information resource management (which is now called information management) in 1980.

In an October 30, 2008, interview, he said he was thrilled to see the development of the iSchool movement and the emergence of more “information schools” or “iSchools.” “iSchool – I couldn’t have thought of a better word,” he said. During this conversation, he also shared his recipe for the school’s continued success: “Imagination and work,” he said.

Two of his seminal works, “Question-Negotiation and Information-Seeking in Libraries” (1967) and *Value Added Processes in Information Systems* (1986), continue to be quoted and relevant to shaping scholarly discussions today. His works have been donated to the Syracuse University Library Special Collections, and his life is being chronicled in a biography by local writer, Russ Tarby.

In November 2008, the Syracuse University School of Information Studies Board of Advisors formally acknowledged his contributions with a resolution in his honor.

An Ithaca, N.Y., native, Taylor earned a bachelor’s degree in history from Cornell University and worked for a short stint as a sports reporter before being drafted into the U.S. Army in 1942. He became a member of the Army’s Counter Intelligence Corps until returning to the United States in 1947.

He enrolled in Columbia University’s library science program on the GI Bill, earning an M.S. in Library Science in 1950. He was named a Fulbright Lecturer in 1956. He went on to work as a librarian, professor and director of information science at Lehigh University and then a professor and director of the Library Center at Hampshire College.

Taylor was predeceased by his first wife, Leni Reichenberger Taylor, to whom he was married for nearly 50 years. He is survived by his second wife of 10 years, Fay Inman Taylor; his stepsons, Anton Reichenberger of Long Island, David Golden and wife Karen of Savannah, Ga., Dan Golden of Hacienda Heights, Calif.; and grandsons William and Max Golden; as well as nieces and nephews most of whom live in the Dallas, Texas area.

Friends and colleagues are invited to leave a remembrance to Taylor at the Syracuse University website. Please visit http://ischool.syr.edu/taylor_temp/taylor_home.html and click on the “Leave a Remembrance” link. Donations are also welcomed for the Fay and Robert Taylor Scholarship fund which can be accessed through the above link. The fund provides partial scholarship and financial assistance to deserving graduate students in the in the Library and Information Science program in the School of Information Studies at Syracuse University. Academic merit and relevant experience are the criterion used to determine selection.
ASIS&T Presents Annual Audit

The report of the ASIS&T auditors on the 2008 financial statements is presented on this and the following pages.

AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY
FINANCIAL STATEMENTS
AND
INDEPENDENT AUDITORS’ REPORT
SEPTEMBER 30, 2008

INDEPENDENT AUDITORS’ REPORT

Board of Directors
American Society for Information Science & Technology
Silver Spring, Maryland

We have audited the accompanying statement of financial position of the American Society for Information Science & Technology (a nonprofit organization) as of September 30, 2008 and the related statements of activities, functional expenses, and cash flows for the year then ended. These financial statements are the responsibility of the Organization’s management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatements. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing accounting principles used and significant estimates made by management, as well as, evaluating the overall financial statement presentation. We believe our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements refered to above present fairly, in all material respects, the financial position of the American Society for Information Science & Technology as of September 30, 2008, and the changes in its net assets and its cash flows for the year then ended, in conformity with accounting principles generally accepted in the United States of America.

Cardini Waddill, LLC
Columbia, Maryland
February 13, 2009

AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY
STATEMENT OF FINANCIAL POSITION
SEPTEMBER 30, 2008

ASSETS

Current Assets
Cash and Cash Equivalents - Headquarters $1,105,170
Cash and Cash Equivalents - Local Chapters 115,479
Accounts Receivable 13,280
Royalties Receivable 96,073
Inventory 4,509
Prepaid Expenses - General 17,418
Prepaid Expenses - Conferences 88,666
Postage Deposits 8,472
Total Current Assets 1,482,539

Property and Equipment, net 140,469

Other Assets
Security Deposit 2,469

Total Assets 1,623,468

LIABILITIES AND NET ASSETS

Liabilities
Accounts Payable $8,095
Income Taxes Payable 1,415
Accrued Expenses 101,078
Deferred Revenue 427,726
Total Liabilities 539,514

Net Assets
Unrestricted, Undesignated 705,984
Unrestricted, Board Designated 319,580
Total Net Assets 1,025,564

Total Liabilities and Net Assets $1,623,468

See Independent Auditor’s Report and Notes to Financial Statements.
## AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY
### STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED SEPTEMBER 30, 2008

<table>
<thead>
<tr>
<th>Support and Revenue</th>
<th>$ 241,045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership</td>
<td>654,157</td>
</tr>
<tr>
<td>Conferences and Meetings</td>
<td>657,392</td>
</tr>
<tr>
<td>Continuing Education</td>
<td>286,576</td>
</tr>
<tr>
<td>Interest</td>
<td>10,199</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1,991</td>
</tr>
<tr>
<td><strong>Total Support and Revenue</strong></td>
<td><strong>1,951,270</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Program support</td>
<td></td>
</tr>
<tr>
<td>Membership</td>
<td>148,587</td>
</tr>
<tr>
<td>Conferences and Meetings</td>
<td>478,073</td>
</tr>
<tr>
<td>Publications</td>
<td>156,257</td>
</tr>
<tr>
<td>Continuing Education</td>
<td>186,517</td>
</tr>
<tr>
<td><strong>Total Program Support</strong></td>
<td><strong>933,524</strong></td>
</tr>
<tr>
<td>Management and General</td>
<td>489,130</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>1,422,654</strong></td>
</tr>
</tbody>
</table>

| Change in Unrestricted Net Assets | 398,816 |
| Unrestricted Net Assets at Beginning of Year | 887,308 |
| Unrestricted Net Assets at End of Year      | 1,086,002 |

See Independent Auditors' Report and Notes to Financial Statements.

## AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY
### STATEMENT OF FUNCTIONAL EXPENSES
FOR THE YEAR ENDED SEPTEMBER 30, 2008

<table>
<thead>
<tr>
<th></th>
<th>Membership</th>
<th>Conferences and Meetings</th>
<th>Publications</th>
<th>Continuing Education</th>
<th>Total Program Support</th>
<th>Management and General</th>
<th>Total Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awards and Honors</td>
<td>$ 7,048</td>
<td>$ 12,486</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 19,533</td>
<td>$ -</td>
<td>$ 19,533</td>
</tr>
<tr>
<td>Books/Products</td>
<td>12,347</td>
<td>4,306</td>
<td>6,992</td>
<td>123,610</td>
<td>316,507</td>
<td>20,939</td>
<td>329,854</td>
</tr>
<tr>
<td>Chapters’ Direct Expense</td>
<td>149</td>
<td>3,134</td>
<td>-</td>
<td>-</td>
<td>3,283</td>
<td>-</td>
<td>3,283</td>
</tr>
<tr>
<td>Depreciation and Amortization</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Duplication</td>
<td>731</td>
<td>685</td>
<td>16</td>
<td>4</td>
<td>1,414</td>
<td>4,906</td>
<td>6,320</td>
</tr>
<tr>
<td>Editorial</td>
<td>-</td>
<td>6,598</td>
<td>33,552</td>
<td>-</td>
<td>40,150</td>
<td>-</td>
<td>40,150</td>
</tr>
<tr>
<td>Equipment Rental and Maintenance</td>
<td>-</td>
<td>-</td>
<td>12,641</td>
<td>-</td>
<td>13,691</td>
<td>26,100</td>
<td>37,741</td>
</tr>
<tr>
<td>Exhibit and Conference</td>
<td>570</td>
<td>48,381</td>
<td>-</td>
<td>13,227</td>
<td>62,178</td>
<td>1,346</td>
<td>63,524</td>
</tr>
<tr>
<td>Insurance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3,920</td>
<td>9,450</td>
<td>13,374</td>
</tr>
<tr>
<td>Legal, Accounting, and Auditing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4,146</td>
<td>54,642</td>
<td>58,788</td>
</tr>
<tr>
<td>Other</td>
<td>13,383</td>
<td>22,554</td>
<td>622</td>
<td>3,777</td>
<td>42,226</td>
<td>60,485</td>
<td>90,711</td>
</tr>
<tr>
<td>Postage and Delivery</td>
<td>14,141</td>
<td>11,412</td>
<td>1,100</td>
<td>170</td>
<td>26,629</td>
<td>7,369</td>
<td>34,000</td>
</tr>
<tr>
<td>Printing and Related Expenses</td>
<td>9,742</td>
<td>30,396</td>
<td>16,023</td>
<td>1,660</td>
<td>56,990</td>
<td>2,346</td>
<td>60,706</td>
</tr>
<tr>
<td>Proceedings</td>
<td>-</td>
<td>5,039</td>
<td>-</td>
<td>-</td>
<td>5,039</td>
<td>-</td>
<td>5,039</td>
</tr>
<tr>
<td>Rent</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Salaries, Benefits, and Taxes</td>
<td>82,404</td>
<td>116,993</td>
<td>20,391</td>
<td>16,674</td>
<td>244,092</td>
<td>261,993</td>
<td>506,085</td>
</tr>
<tr>
<td>Supplies and Materials</td>
<td>1,190</td>
<td>3,174</td>
<td>-</td>
<td>-</td>
<td>4,364</td>
<td>6,681</td>
<td>11,064</td>
</tr>
<tr>
<td>Tax</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,838</td>
<td>-</td>
<td>2,838</td>
</tr>
<tr>
<td>Telephone</td>
<td>101</td>
<td>6,741</td>
<td>1,241</td>
<td>4,830</td>
<td>13,190</td>
<td>5,031</td>
<td>18,821</td>
</tr>
<tr>
<td>Temporary/Consulting Services</td>
<td>2,641</td>
<td>550</td>
<td>-</td>
<td>7,846</td>
<td>11,1471</td>
<td>7,545</td>
<td>18,692</td>
</tr>
<tr>
<td>Travel and Related Expenses</td>
<td>-</td>
<td>16,742</td>
<td>-</td>
<td>9,019</td>
<td>27,761</td>
<td>4,897</td>
<td>32,658</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$ 149,657</strong></td>
<td><strong>$ 476,573</strong></td>
<td><strong>$ 105,677</strong></td>
<td><strong>$ 190,517</strong></td>
<td><strong>$ 391,524</strong></td>
<td><strong>$ 489,130</strong></td>
<td><strong>$ 1,402,654</strong></td>
</tr>
</tbody>
</table>
AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY
STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED SEPTEMBER 30, 2008

Cash Flows From Operating Activities
Change in Net Assets $396,616
Adjustments to reconcile change in net assets to cash $46,349
Cash Provided by Operating Activities 10,472
Royalties Receivable 73,100
Inventory (808)
Prepaid Expenses - General (3,015)
Prepaid Expenses - Conferences (17,466)
Postage Deposits 5,177
Increase (Decrease) in Liabilities 20,930
Accounts Payable (9,341)
Income Taxes Payable 1,415
Accrued Expenses 69,031
Deferred Revenue 1,126
Net Cash Provided by Operating Activities 561,203

Cash Flows From Investing Activities
Purchase of Property and Equipment (6,976)

NET INCREASE IN CASH AND CASH EQUIVALENTS 564,227

CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR 695,421

CASH AND CASH EQUIVALENTS AT END OF YEAR $1,259,648

Cash and Cash Equivalents at September 30, 2008 Consisted of:
Cash and Cash Equivalents - Headquarters $1,135,120
Cash and Cash Equivalents - Local Chapters 115,476
$1,250,648

Supplemental Disclosure of Cash Flow Information:
Cash Paid During Year for Income Taxes $1,000

See Independent Auditors’ Report and Notes to Financial Statements.
SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (Continued)

Use of Estimates: The preparation of financial statements, in conformity with generally accepted accounting principles, requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

Deferred Revenue: The Society’s deferred revenue represents membership dues, conference registration fees and publication subscriptions for which services have not yet been provided.

Income Taxes: The Society is exempt from federal and state income tax (except taxes on unrelated business income) under Section 501(c)(3) of the Internal Revenue Code. Although the Society is exempt from income tax it has certain activities considered unrelated to its exempt status that are subject to income tax. The Society has accrued taxes of $1,415 for unrelated business income for the year ended September 30, 2008.

NOTE 1. CONCENTRATIONS OF CREDIT RISK

The Society’s financial instruments that are exposed to concentrations of credit risk consist primarily of cash. The Society places its cash with high credit quality institutions. At times, such cash balances may be in excess of the Federal Deposit Insurance Corporation (FDIC) insurance limit. The Society has not experienced any losses in such accounts and believes it is not exposed to significant credit risk.

In September 2008, the Society entered into an arrangement with a bank whereby a portion of their cash deposits are spread among partnering banks to allow for greater FDIC protection.

NOTE 2. PROPERTY AND EQUIPMENT

A summary of property and equipment at September 30, 2008 follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture and Fixtures</td>
<td>$ 8,789</td>
</tr>
<tr>
<td>Computer and Office Equipment</td>
<td>197,246</td>
</tr>
<tr>
<td>Leasehold Improvements</td>
<td>11,285</td>
</tr>
<tr>
<td>Digital Library</td>
<td>106,424</td>
</tr>
<tr>
<td>Web Redesign</td>
<td>59,988</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>335,322</strong></td>
</tr>
</tbody>
</table>

Less: Accumulated Depreciation and Amortization ($13,283)

**Depreciation and amortization expense was $46,349 for the year ended September 30, 2008.**

NOTE 3. BOARD DESIGNATED NET ASSETS

The Board of Directors of the Society has designated net asset balances into the following funds as of September 30:

<table>
<thead>
<tr>
<th>Fund</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve Fund</td>
<td>$134,278</td>
</tr>
<tr>
<td>Chapter Development Fund</td>
<td>5,000</td>
</tr>
<tr>
<td>Local Chapter Funds</td>
<td>116,478</td>
</tr>
<tr>
<td>Special Interest Group Funds</td>
<td>5,000</td>
</tr>
<tr>
<td>Special Interest Group Funds</td>
<td>50,620</td>
</tr>
<tr>
<td>Chapter Project Funds</td>
<td>3,800</td>
</tr>
<tr>
<td>SIG Digital Scholars Fund</td>
<td>11,774</td>
</tr>
<tr>
<td>Scholarship Fund</td>
<td>4,518</td>
</tr>
<tr>
<td>New Initiatives Fund</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>319,965</strong></td>
</tr>
</tbody>
</table>

NOTE 4. COMMITMENTS

Leases: The Society is obligated under two non-cancelable lease agreements for office space which expire in the year 2019 and a lease agreement for office equipment expiring in 2009. The amounts due under the office leases are subject to increases based on the greater of a fixed 4% annual escalation or on a percentage of the change in the consumer price index. The minimum future rental commitments through the remaining term of the leases are as follows:

<table>
<thead>
<tr>
<th>Year ended September 30:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Rent expense for the year ended September 30, 2008 was $43,662.

Contracts: In 2008, the Society renegotiated its contract with Wiley – Blackwell (John Wiley and Sons, Inc.) in which the Society turned over the publication, distribution, and storage of the Society’s journal. In addition, the Society gave Wiley rights to all gross revenues earned from the journal. In return, it was promised royalties which currently amount to 50% of the net revenues from the journal. The monies are paid by Wiley in April for the calendar year preceding. As of September 30, 2008, royalties of $483,096 has been earned and recognized under the contract.

The Society has entered into various contracts with hotels for meeting rooms and guest rooms for its meetings to be held in fiscal year ending September 30, 2009. The total values of the contracts are still to be determined. The Society, however, could be liable for a portion of the cost of the rooms not filled or if the event is cancelled.

NOTE 5. PENSION PLAN

The Society sponsors a defined contribution retirement plan that operates under section 403(b) of the Internal Revenue Code. The Plan covers all full-time employees and part-time employees with more than 1,000 hours of service. Participation in the Plan begins after completion of twelve months of service. Employees may contribute to the Plan and the Society contributes 6% of the portion of the employees’ salary within the Social Security wage base. The Society’s contributions to the Plan total $17,612 the year ended September 30, 2008.
Introduction
by Helen R. Tibbo, Rachael Green Clemens and Carolyn Hank, Guest Editors

On April of 2008 the Carolinas Chapter of ASIS&T held its inaugural event entitled Institutional Repositories: The Great Debate. In the spirit of 18th and 19th century college debating societies, a challenge was issued for deliberation of a resolution involving the concept of the institutional repository. Two orators accepted the summons to publicly argue the affirmative and negative positions. Helen Tibbo of the School of Information & Library Science at the University of North Carolina Chapel Hill took the affirmative; Kevin L. Smith, the scholarly communications officer at Duke University, spoke for the negative position.

During this dialog dual, numerous issues were explored, such as the fundamental question of definitions: What is an institutional repository? How do topics such as scholarly communication, copyright, institutional memory, mandates, leadership, digital libraries, open source software, metadata, intellectual property, research impact, digital preservation and the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) fit into the concept and implementation of an institutional repository?

To continue the heated discussion we present this special section of the Bulletin. We offer readers the opportunity to experience lively intellectual deliberation on the important but often contentious subject of the institutional repository.

In this collection of brief articles we asked contributors to provide either a pro/affirmative or a con/negative argument in response to one of four important issues within the arena of institutional repository:

**Topic 1:** All universities should have an institutional repository.

**Topic 2:** Libraries should lead the institutional repository initiative and development at their institution.

**Topic 3:** Institutional repositories should be built on open source software.

**Topic 4:** Institutional repository success is dependent upon mandates.

We gave each author the opportunity to promote a personal position or perhaps assume the salacious role of an opposing viewpoint. Please note: Each essay may or may not reflect the true position of an author – each is presented merely as an argument for the reader to consider.

We hope this format will provide readers with an engaging and insightful learning experience with the ultimate message that institutional repositories are in fact multidimensional with complex challenges and opportunities. In addition we expect the format will help assuage the absence of strong public rhetoric with the close of the U.S. electoral season.

Our sincere thanks to each contributing author for sharing your time and expertise with the larger community.
Affirmative Argument

Soo Young Rieh
Associate Professor, School of Information, University of Michigan
Email: rieh<at>umich.edu

The MIRACLE (Making Institutional Repositories a Collaborative Learning Environment) Project team at the University of Michigan reports that about 50% of four-year colleges and universities in the United States have either planned or implemented institutional repositories [1] while the other half has done no planning for institutional repositories. University administrators, library administrators and staff in these non-planning institutions may, however, need to decide whether to jump on the institutional repository bandwagon. This article’s purpose is to convince decision-makers in the non-planning stage that it is time for them to act on developing an institutional repository.

“Why don’t you just do this?”

One librarian who participated in our case studies said that she got a clear message from an institutional repository (IR) manager in one of her peer institutions: “Why don’t you just do this?” Even though “this” goes by various different names – DSpace (MIT), Deep Blue (Michigan), the Knowledge Bank (Ohio State), ScholarWorks (University of Massachusetts), IDEALS (Illinois) and eScholarship (California), these repositories have similar purposes and functionalities across institutions. Library staffs, library directors, archivists and others involved in institutional repositories possess a good understanding of the kinds of benefits and value an institutional repository can bring to both academic institutions and society [2].

First, an institutional repository provides the opportunity to create one

Negative Argument

Kevin Smith
Scholarly Communications Officer, Duke University
Email: Kevin.L.smith<at>duke.edu

When I was a child, one of the favorite places for my brother and me to play was in the attic of my grandmother’s house. There were a couple of specific attractions of her attic for two young and mischievous boys. First, the attic seemed to be a hidden place, since the doorway to its staircase was in a closet and behind a rack of clothes in large storage bags. Second, we never knew just what we would find up there. I remember vividly an old-fashioned electric fan that worked only sporadically, several incomplete jigsaw puzzles, pieces of antique luggage covered in destination stickers and a GI Joe figure that was missing one boot. Lots of fodder for imagination and play, but, since things in the attic were pretty well abandoned, little effort was made to keep them complete and in working order.

My grandmother’s attic was a wonderful place to play, but it is a poor model for an institutional repository. I have a very real concern that, if the proposition were adopted, many of the resultant repositories would look a lot like that attic.

First, as repositories proliferate, especially at smaller institutions that may lack adequate funding, staffing and expertise, the issue of finding material that is hidden in those repositories becomes a concern. The Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) [5] provides a structure for creating repositories that can be searched by Google and made interoperable with other repositories and search tools,
central virtual place into which university members can deposit their scholarly and administrative digital content. When various digital materials, including faculty e-prints, student work and archival primary sources, are put together, digital content has the potential to become the greatest intellectual capital of an institution. Once a digital collection is in place, excitement quickly mounts as it introduces a whole new way of accessing and using digital content. As one librarian said during an interview, an IR “provides access to those collections that no one would ever know exists.” Another library staff member sounded even more excited in claiming that an institutional repository allows “serendipitous discovery across disciplines that was not possible.”

If all this enthusiasm does not sound convincing enough, there is more. Given that technology will only keep changing, individuals, though able to keep up with the technology in their working and everyday lives, may well find themselves unable to migrate their own personal digital content from one technology to another without a system – like an institutional repository – that makes it possible to manage technological changes institutionally while promising to preserve intellectual output in the long term.

“We are always interested in what our peer institutions are doing.”

The Census of Institutional Repositories in the United States [1] found that there is “a sleeping beast of demand” on the part of small and mid-size universities and colleges with respect to institutional repositories. Although the majority of small and mid-size institutions have not yet begun planning for an institutional repository, they proved surprisingly positive about institutional repositories and were certainly interested in “stories about how small institutions made their institutional repositories a reality.” These institutions have been somewhat slow in joining the institutional repository bandwagon not because they were unaware of the value of IRs but because they lacked models, best practices and guidelines from their peer institutions. In fact, their institutional repositories look very different from those at research universities regarding content, audience, qualifiers and even uses. For instance, small and but its application requires a degree of sophistication that may not be available at every university.

At this point it is worth a digression to consider the definition of a university in the proposition that all universities should have an institutional repository. If university is defined quite narrowly to include only very large institutions, some of the problems about staffing and funding may not be too serious; however, such a constricted definition is problematic and artificial. There are many smaller universities and colleges (the distinction is often blurry or simply not observed by schools that retain traditional labels as curriculums expand or contract) that have unique materials and faculty scholarship that deserves exposure in a digital repository. Subjecting those institutions to an arbitrary requirement that each have their own such archive could either discourage them altogether or lead to inexpertly managed repositories. One of the potential problems would be a proliferation of non-OAI compliant repositories with content that would be very difficult to locate. Although some schools might want a repository for purposes of “branding” themselves, we need to remember that very few searchers access our digital content by “walking through the front door.” If repository content cannot be found through traditional means of searching the Internet, that content will be as hidden as the stairway to Nana’s attic was.

The second characteristic of that attic was that it contained a motley and unsorted collection of stuff. If an institutional repository is OAI compliant, and users find material by searching in Google Scholar or a similar tool, the random nature of deposits in small repositories will not be visible or problematic. Conversely, if users of a non-OAI compliant repository were to come through the branded portal, the thin and unselected nature of the materials they might encounter would be obvious.

There are several ways to address this potential embarrassment for institutions lacking the necessary resources to build and maintain strong IRs. One is to take advantage of the editing and peer-review processes
mid-size institutions are often more interested than large institutions in consortia. Also, the institutional repositories of these smaller institutions may have digital content oriented more toward teaching objects than research products.

These small- and mid-size institutions recognize the value of students’ work as an important part of institutional repository content. A library director in a small university reported during an interview that her institution saw an institutional repository as “something that’s potentially positive because it’s a way for students to get their work out and around beyond the boundaries of themselves and their professors.” An archivist at a small college expressed excitement on realizing that an institutional repository provides a great opportunity to archive student newspapers.

Interview participants in the MIRACLE Project apparently agree that preservation is “one of the biggest things” across various types of universities and colleges. While there are still many unknowns in building and maintaining digital collections in perpetuity, most people involved in institutional repository development are confident in the long-term sustainability of institutional repositories. The good news is that the confidence level is even higher at institutions that already have operational IRs than at those in which institutional repositories are still being planned or pilot-tested [3].

“I don’t know where I could archive it.”

The discussion above focuses on the perceptions of library staff and administrators based on interview data collected during the MIRACLE Project’s phone interviews conducted in the fall of 2006. Next, we consider the perspectives of institutional repository users, of which there are two types: contributors and searchers.

An example of a contributor is a scholar who has a dataset from his research projects, but doesn’t “know if I should be saving [this], I don’t know how I would describe [it], I don’t know where I could archive it, I don’t know if I should be sharing it or how I could share it – could you help me figure this out?” [3] Institutional repositories are not the only type of self-archiving venue: 684 respondents of Kim’s (2008) survey reported self-archiving in personal that most scholarly journals already have in place by limiting IR deposits to articles accepted for publication in such journals. Such a policy would preserve a level of quality, but it would exclude potentially valuable material like archival materials, working papers, data sets and the like, as well as most multimedia objects. Another option would be to have an editorial process in place, by which submissions to a repository would be evaluated, corrected and sorted into appropriate collections of similar material. To do this task, of course, the repository would need a dedicated and professional staff and a critical mass of content – both of which are unlikely for many IRs at smaller universities. Finally, a small university could elect to combine its content with that of other institutions, either on a disciplinary basis or within a consortium, in order to reach critical mass and obtain some level of professional management. OAI compliance would be necessary for this cooperation to happen, but the technical and metadata expertise necessary could be pooled across the consortium. This option, I argue, is the real solution for many universities and is the reason the proposition that all universities should have their own repositories must be rejected.

A final similarity between some repositories and my grandmother’s attic is that the material contained in each may be left to decay, deteriorate and be forgotten. For an institutional repository to serve its important functions, there must be a commitment to preservation that is simply beyond the means of many small institutions. At this point in time, we just do not know how long digital objects will persevere without intervention. It is also impossible to predict accurately the changes in technology that will make one format inaccessible and necessitate a transition to some new, yet-to-be-created file structure. A real promise of preservation requires support for an open-ended commitment to necessary future cost, which remains unknown and, probably, unknowable. Even large universities doubt whether this commitment is sustainable. It would be foolish and irresponsible for smaller or less well-funded institutions to jump into the institutional repository business without any hope of living
Affirmative, from page 14

web pages, department/school/college websites, research group/lab/center websites, disciplinary repositories and/or institutional repositories. Although institutional repositories were not the top choice for most self-archiving researchers, they can be appealing, given their ability to preserve materials [4].

Now let’s turn to the other type of institutional repository users – searchers. Why do they want to use the institutional repository? The institutional repository searchers whom the MIRACLE Project team interviewed stated a wide variety of benefits associated with using institutional repositories. For instance, one interviewee asserted, “It’s kind of like a central receptacle of research going on only here and it’s worthwhile to get an idea what’s around you before you search on a search engine that’s much broader.” Another way in which institutional repositories are outshining other information systems is their perceived trustworthiness. Many of our interviewees expressed the opinion that institutional repositories and their content are more reliable than information from search engines such as Google and Google Scholar.

All universities should have an institutional repository.

Nobody can say for certain how an institutional repository should be developed, what kinds of content should be included or how the system should be maintained. However, this much is certain: if an institution has not undertaken planning an institutional repository, it should consider doing so now. Even though there is quite a bit of uncertainty remaining about how institutional repositories should function, joining the institutional repository bandwagon right now is important if an institution does not want to fall behind. A library director who participated in our case studies said, “Capacity is the best way to think about it [institutional repository].” That point is well taken. Institutional repositories should be considered an infrastructure investment for the future. When self-archiving becomes an established norm in the scholarly and social culture, universities should already be prepared with a technologically supportive mechanism. All universities should be proactive in developing a strategy for scholarly publishing and preservation. Institutional repositories will, without doubt, play a key role in evolving in that direction.

Negative, from page 14

up to the necessary commitment to sustainability and preservation.

Benign neglect was sufficient for our attic-cum-playground, but it is not a workable model for a functioning institutional repository.

For institutional repositories to become a sustainable presence and an agent of change on the landscape of scholarly communications, they must grow out of carefully considered decisions universities make on the basis of local needs, a sensible commitment of resources and a rational awareness of the long-term commitment to support. For some institutions, that decision will inevitably be in the negative. For those universities it is important to provide alternatives that can help them expose valuable assets that contribute to scholarship without burdening them with guilt or negative judgments. Shared repositories may provide a good solution for these institutions. Such repositories may be disciplinary, modeled on the very successful archives already in operation for physics, economics and other disciplines. (For example, see the ArXive repository for physics, mathematics, computer science, quantitative biology, quantitative finance and statistics at http://arxiv.org/, and the RePec collaboration in economics at http://repec.org/.) Alternatively, they may be consortial efforts such as the ones managed by the OhioLINK consortium, for example, their shared repository of electronic theses and dissertations at www.ohiolink.edu/etd/

These shared solutions to open access for scholarly content offer the best opportunity for repositories that are high quality, sustainable, and in which important material can be located easily. Such cooperation is not merely for the small institutions that cannot afford their own single-institution repositories; larger universities may find that cooperative development leads to better repositories that offer both a critical mass of content and a stronger trajectory into the future. Insofar as the proposition with which this debate begins – that all universities should have an institutional repository – downplays the importance or hinders the development of such shared solutions, it must be rejected.
Resources Mentioned in the Topic 1 Debate


Topic 2
Libraries Should Lead the Institutional Repository Initiative and Development at Their Institutions

Institutional Repositories: The Great Debate

**Affirmative Argument**

Jim Ottaviani
Jim Ottaviani, Coordinator, Deep Blue, University of Michigan Library
Email: hellpop<at>umich.edu

*Libraries make people crazy. Nobody says it that way or in those exact words, but some of the things librarians do, I swear…*

We ask people to return things, and if they’re overdue sometimes we charge them for it (unless they’re faculty, for whom even the idea of overdue fees and returning materials may be objectionable). We don’t buy enough good stuff, and we buy too much stuff that nobody cares about (meaning for many users: not enough of what I read, too much of what they read). Perhaps it’s a complaint unique to Michigan, but also generally we won’t violate copyright law for anyone’s convenience. (“I know you and Google scanned it, so let me have the digital copy!”)

Crazy. But for all our flaws, people also know libraries are expert at two things: free and forever.

Not that the material we provide access to is free, and not that we don’t realize that our best efforts at preservation sometimes fall short. But librarians are

**Negative Argument**

Carolyn Hank
TRLN Doctoral Fellow, School of Information and Library Science, University of North Carolina at Chapel Hill
Email: hcarolyn<at>email.unc.edu

*Recent surveys show that libraries indeed are leading in institutional repository initiatives and developments at their institutions. The Census of Institutional Repositories in the United States: MIRACLE (Making Institutional Repositories a Collaborative Learning Environment) Project Research Findings [1] reports that libraries take on between 40 to 60% of the responsibility for institutional repository planning and pilot testing. Other institutional units such as archives, central computing, CIO offices and central administration participate at these stages though with a considerably reduced amount of responsibility. At the deployment and implementation stage, however, the disparity of responsibility between these institutional units shifts considerably, with libraries taking the lead and assuming the majority share for their respective institutional repositories. A survey of members of the Association of Research Libraries (ARL) on institutional repository development and deployment also found that libraries lead [2]. Units within the libraries, for the most part, are primarily responsible for institutional repository administration.*

Returning to the topic of this position piece, it is not so much a question of whether or not libraries should lead. Libraries should very much be active leaders in institutional repositories, although institutional repositories require an extensive investment of resources for development and administration. The associated tasks necessitate a planned and deliberate coordination of a diverse and extensive collection of stakeholders, both within the library and most definitely outside of the library, including scores of producer and consumer sub-groups. Libraries have a rich history of serving the needs of these subgroups through traditional library functions and services, but
negative, from page 17

Transferring this traditional library expertise to the requirements of a successful institutional repository program is not so transparent. It raises fundamental questions of both capacity (for instance, sufficient staffing levels) and capability such as sufficient staff skill and knowledge.

Instead, I believe this is a question about how libraries should lead. Libraries should not lead institutional repository initiatives if leadership, and subsequent institutional repository management, is exclusive. That is, libraries should share leadership and operational responsibilities with other campus units. From several years’ experience participating in institutional repository planning activities at a large research university, I understand the many challenges associated with institutional repository development, particularly in coordinating with numerous campus constituencies in a landscape of too many priorities and too few resources. Libraries are well positioned to lead; this responsibility should be, however, a joint management endeavor at the operational level, with concrete contributions from other institutional units as opposed to simply expressions of affirmative sentiment.

Consider trends in institutional repository deployment. In a 2004 interview Cliff Lynch described institutional repositories as “terribly fashionable” and said “everyone wants to claim to be building one” [3]. Three years later, in the forward to the MIRACLE census, Abby Smith wrote, “One of the paradoxical findings of the survey [is] that there is detectable urgency on the part of libraries to implement institutional repositories, even as early adopters report difficulties in achieving the purposes for which they built them” [1, Foreword]. While there are many mitigating factors that impact adoption and success in institutional repository development, these quotes reflect a challenge for leaders. How do libraries manage institutional repositories, negotiating among the ever-evolving needs, objectives and issues, in light of the current climate of shrinking budgets, a lousy economy and shifting priorities at institutional and departmental levels? If they wish to take on this task just as early adopters are revisiting their institutional repository programs in light of post-deployment difficulties, libraries should reconsider their approaches to leadership and management by revisiting the seminal definition of an institutional repository provided by Lynch in 2003 [4].

Lynch wrote, “While operational responsibility for these services may reasonably be situated in different organizational units at different universities, an effective institutional repository of necessity represents a collaboration among librarians, information technologists, archives and records managers, faculty, and university administrators and policymakers.” Seven years after this statement was published, operational responsibility sits squarely within libraries. This

affirmative, from page 17

magicians when it comes to hiding costs from users – articles from licensed journals materialize on desktops at the twitch of a finger, leading their readers to think they cost nothing. And if it’s old or fragile or rare? Researchers know better than to turn to their own shelves or rely on publishers for access to this kind of material. They come to libraries assuming that we have it and that we won’t make them pay to get it.

What does this all mean for libraries’ role in institutional repository development? Since the concept of free and forever is baked into the definition of an IR, librarians should find leading IR initiatives as natural as breathing.

Better still, IRs offer many additional features that libraries are adept at providing, such as access control and format migration. Most authors don’t think hard, and perhaps not at all, about those things, and they shouldn’t have to do so. That’s the library’s job, not theirs. To be fair, others have made it their job as well: Academic publishers are, after all, excellent at control and have realized the importance of migration. (Though in the early days of digitization, where did they go to fill in the often-huge gaps in runs of their backlist journals? Three guesses, and the first two don’t count.) So libraries are not uniquely capable in these areas, but they are arguably the best choice to lead institutional repository development and long-term preservation of access. Commercial academic publishers don’t provide preservation services to individuals, on-demand or without charging a lot of money. Libraries do those things, with handholding and a pat on the back added in as a bonus when needed.

Better still, IRs offer many additional features that libraries are adept at providing, such as access control and format migration. Most authors don’t think hard, and perhaps not at all, about those things, and they shouldn’t have to do so. That’s the library’s job, not theirs. To be fair, others have made it their job as well: Academic publishers are excellent at control and have realized the importance of migration. (Though in the early days of digitization, where did they go to fill in the often-huge gaps in runs of their backlist journals? Three guesses, and the first two don’t count.) So libraries are not uniquely capable in these areas, but they are arguably the best choice to lead institutional repository development and long-term preservation of access. Commercial academic publishers don’t provide preservation services to individuals, on-demand or without charging a lot of money. Libraries do those things, with handholding and a pat on the back added in as a bonus when needed.

Better still, IRs offer many additional features that libraries are adept at providing, such as access control and format migration. Most authors don’t think hard, and perhaps not at all, about those things, and they shouldn’t have to do so. That’s the library’s job, not theirs. To be fair, others have made it their job as well: Academic publishers are excellent at control and have realized the importance of migration. (Though in the early days of digitization, where did they go to fill in the often-huge gaps in runs of their backlist journals? Three guesses, and the first two don’t count.) So libraries are not uniquely capable in these areas, but they are arguably the best choice to lead institutional repository development and long-term preservation of access. Commercial academic publishers don’t provide preservation services to individuals, on-demand or without charging a lot of money. Libraries do those things, with handholding and a pat on the back added in as a bonus when needed.
responsibility may have been charged (that is, delegated by the provost) or self-fulfilled (that is, adopted by libraries). Do we know if a co-managed, shared operational model would be more beneficial than exclusive operational management by libraries? No, because we do not have a pool of examples from which to evaluate. Granted, such a shared management and operations model would not be easy to implement since collaboration, like leadership, is a challenging task. The challenge is reflected in the second part of the excerpt above and raises the issue of the (at times) ambiguous distinctions between collaboration and cooperation.

To cooperate in institutional repository development is to support it. “Cheerleading,” or advocacy, should be placed on the side of cooperation. To collaborate in institutional repository development, however, is to contribute to it. Resource allocation is very much on the side of collaboration (for example, programming, hardware and software support; staffing and funding).

Again, considering the findings from the MIRACLE census and the ARL survey, there is evidence of both collaborative and cooperative partnerships between the cast of players described by Lynch. However, these partnerships are most active during planning and pilot testing phases and tend to drop off at the operational stage. This trend was confirmed in interviews this author conducted for a study on institutional repository planning [5]. Institutional repository managers were asked to comment on their libraries’ collaboration with other campus units. Interviewees described their activities as a library-specific enterprise, with the exception of campus-wide representation on planning committees. As institutional repositories continue to develop and emerge, new collaborative models for operational management may very well contribute to improved and sustainable services.

Continuing to borrow from Lynch, an institutional repository is “most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution.” Organizational commitment may be manifest in many ways, including dollars. Just as surveys show a trend in responsibility between planning (shared) and operational management (exclusive), there is also a trend in funding between initial infusions of project and planning support to subsequent operational, recurring funds. Per the MIRACLE census, funding is primarily provided – or will be provided for planned and piloted instances – by libraries.

A fuller treatment grounding Lynch’s definition in actual, real-world deployment activities is outside the scope of this paper. But even this abbreviated consideration leads to the question: Can libraries, exclusively, accomplish the tasks explicit in Lynch’s definition in their institutional...
mentioned above, this sort of service still feels new. It shouldn’t, but it does.

So back to easy stuff by way of reconsidering those crazy things libraries do in the context of an IR…since IRs fix them all! We don’t need anything returned to an IR once it’s downloaded – it’s still there, in perfect shape. Our faculty determines an IR’s content themselves – if they want something good in the library, all they have to do is put it there and we’ll take care of everything else. And since it’s their stuff, it’s there to be downloaded if they say it should be. Few (and ideally, none) of the things in an IR cannot be accessed immediately upon deposit, so there are no worries about us hiding the digital versions of useful work, unless that’s what the depositor asks us to do. And we understand copyright, so we can help faculty cut better deals with publishers or at least go into the publishing arena with open eyes.

But these considerations are all secondary. It’s really about free and forever, and libraries proved we’re the best at those things decades, maybe even centuries, ago. In fact, we’ve been so far out in front of these issues and ideas for so long that we’ve become invisible. We can change that. Libraries should lead, because they already do, and do it well.

repository development and deployment activities? From reports on planning, libraries have been deliberate in building a cohort of stakeholders from across the institution to inform project development activities, reflected in the diversity of institutional repository planning committees. However, in the transition from projects to emerging, and presumably sustainable, programs, the libraries’ role has transformed from major player to sole player. This change complicates the already intense task of building and managing institutional repositories.

For an appreciation of the extent of this endeavor, consider the complex and comprehensive criteria enumerated in the Trustworthy Repositories Audit & Certification (TRAC): Criteria and Checklist [6]. This reference is offered not to advocate audit and certification for all repositories (though that would be another useful exercise for the affirmatives and negative stances taken throughout this special section), but simply to demonstrate the series of critical steps, requirements and decisions necessary for the development and operation of a “trustworthy” institutional repository. Potentially, libraries, and in turn institutional repositories, would be better served though a sharing of these responsibilities with other expert agencies on campus. It would certainly decentralize the requisite funding and thus present a potentially more sustainable model.

Further, the need to reconsider shared leadership is not just exclusive to the institutional setting. Libraries should also look to collaborations and resource sharing with other libraries and organizations external to their respective institutions. There are several examples of deployed consortial institutional repositories, but there are other ways, bound by consortial boundaries or not, that libraries can build these ties or improve upon existing collaborative relationships.

To return to the question: Can libraries, exclusively, accomplish the tasks explicit in Lynch’s definition in their institutional repository development and deployment activities? My simple response: No. My irresistible, hokey response: Just like there is no I in Team, there is no I in Lead (and yes, I know I should have just resisted).
Resources Mentioned in the Topic 2 Debate


# Topic 3

## Institutional Repositories Should Be Built on Open Source Software

<table>
<thead>
<tr>
<th>Affirmative Argument</th>
<th>Negative Argument</th>
</tr>
</thead>
</table>
| **Paul Jones**  
Director of ibiblio.org; Clinical Associate Professor, School of Journalism and Mass Communication and School of Information & Library Science, University of North Carolina at Chapel Hill  
Email: pjones<at>metalab.unc.edu | **Michael Day**  
Research Officer UKOLN, University of Bath  
Email: lismd<at>ukoln.ac.uk  
**Alexander Ball**  
Research Officer, UKOLN, University of Bath  
Email: aball<at>ukoln.ac.uk |

A quick glance at the most recent statistics produced by the *OpenDOAR* Directory of Open Access Repositories suggests that the vast majority of existing institutional repositories are currently built upon open source software. For example, the tables show that at the end of January 2009, almost half (47 percent) of the repositories listed in the directory use one of the two leading open source repository packages [8]. While this prevalence demonstrates that there is certainly a market for open source repository software, it does not necessarily follow that all repositories should be built upon it. To argue this point is not to suggest that there is anything fundamentally wrong with the open source development model itself. The open source philosophy has proved itself to be a very successful model for software development. It has also been a major inspiration for the collaborative models that underpin many recent Internet developments as well as for the concept of open science [9]. In the institutional repository context, however, there are a number of reasons why an insistence on open source software solutions may not be strictly necessary.

**Open source** [1] developers and users are unusually passionate about their work, unusual in ways that make things work well. So let me begin passionately as we talk about open source as the solution for support of institutional repositories.

> You want to use, you must use, open source software for your institutional archives. Any other choice would be un-archival and unsustainable in the long run.

Now that we have that behind us, let’s discuss some of the myths and some of the reasons for dedicating your institutional repository to the use of open source software, open standards and open formats which, I contend, are inseparable.

The problem in engaging in the argument over whether institutional repositories should always use open source software is that the negative side will constantly chase the odd case that may not fit the general rule in hope that if they can accumulate enough specific odd cases falsification will seem to occur. This is Karl Popper’s falsifiability from his landmark, *The Logic of Scientific Discovery* [10]. While at any given time repositories will have to be supported by a set of technologies, Lynch argues that they essentially constitute an organizational commitment to the ongoing stewardship of the digital content created by...
Logic of Scientific Discovery [2]. But Popper’s empirical falsification approach was challenged if not overturned by Thomas Kuhn’s notion of the paradigm shift, which he detailed in The Structure of Scientific Revolutions [3]. I cite these as a warning not to miss the shift in software practice while being caught up in falsification’s web.

Institutional repositories have taken a few knocks in the six years since Cliff Lynch’s “Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age” appeared in ARL 226 [4]. But I’m concerned more here about the upcoming crashes than the bumps we hit on the road to more settled standardizations.

While we have had a number of attempts at choosing standards to aid curation of the materials within our repositories, we are and will be hostage to changes in formats across time. Curation will always include migration as Lynch notes in his article. Migration in turn requires an understanding of the original formats as well as a consideration of the target formats. Formats are often bound to the context in which they are stored and retrieved. Thus access to the code that controls the items and their formats is almost as important as the formats themselves. Thinking ahead to allow for maximum ease (or least pain) for the inevitable migration of formats that curation entails means planning for long-term access to the code that controls the repository environment. Some vendors of various software solutions offer to put their code into escrow for future use were they to go out of business; however, this provision is no substitution for full open and continuous access to the code.

Proprietary software vendors often try to finesse the open source access promise by offering small customizable ports of entry into their code, usually as application program interfaces or APIs. Like software escrow promises, this is a short-term an institution and its members, and that a key service will be “the management of technological changes, and the migration of digital content from one set of technologies to the next.” Even where institutions have motives other than long-term stewardship for setting-up repositories, it remains the case that the technical aspects of systems will need to evolve through time to take account of changes in institutional policies and requirements and to take advantage of the functionality offered by the latest software platforms and tools. In this rapidly changing context, it does not make sense to limit the choice of tools to just those that happen to follow a particular software-licensing model.

Dealing with the practical aspects of repository development highlights a second set of reasons why open source software should not necessarily be seen as essential for institutional repositories. As suggested above, the technical choices that need to be made by repository managers should be grounded firmly in institutional requirements. The questions that institutions need to ask include, for example, whether it would be possible to integrate (or develop) other tools within the chosen software framework; whether the system – when developed – would be able to interoperate with all relevant systems, both internal and external; and whether it would be possible to get content (and its associated metadata) in and out of the system easily. The answers to these questions – primarily focused on the consistent use of standards and application programming interfaces (APIs) – should be far more important than the exact software development model in use. In any case, utilizing open source software does not guarantee that institutions will avoid the potential problems of vendor lock-in or ensure that repository platforms will be either stable or sustainable. Institutions can attempt to hedge some of these technical questions either by cooperating with other institutions or by contracting out repository development and/or hosting to specialist organizations. A growing number of subscription-based services are now emerging that aim to provide institutions with repository services, with options based on both open source and proprietary software. Whatever repository development choices are made, however, it will be necessary to ensure that systems do not become dead-ends. This outcome will be dependent on the appropriate use of standards. For example, in their paper on the outsourced University of Wollongong repository, Organ and Mandl have pointed out that one of their key principles “was to deploy a repository consistent with a range of standards so that material loaded could be transferred as necessary at a later date to a different system” [11].
A third set of reasons why open source software should perhaps not be viewed as the only acceptable approach to institutional repository development relates to the nature of the open source process itself. Open source software, by its very nature, tends to be developer driven. In itself, this attribute need not be a problem. However, in the repository domain, this can result in a mismatch between specific institutional requirements and what software is actually able to provide at a given moment of time. While in an ideal open source context, collaborative community development would be able to fill gaps and resolve many of the other potential conflicts, the anecdotal examples provided by Dorothea Salo in her recent article on institutional repositories suggests that the current situation is far from perfect. While recognizing many of their benefits, she comments that the three main open source software offerings currently “offer varying quantities of installation and maintenance headaches, expensive hardware demands, customization and development hassles, and poor fit with existing library software, websites, and services” [12]. Similarly, a 2007 report for UNESCO’s Memory of the World program suggested that one of the major open source repository platforms “has evolved into a monolithic software application, and complex code base, that introduces potential scaling and capacity constraints for some large institutional users” [13]. While it is fair to point out that these problems are certainly not unique to open source, it may be a signal that software development in the repository domain is currently immature. Certainly the rapid development cycles typical of open source software can make the local customization of repositories problematic. Time spent carefully redesigning repository interfaces to meet local needs can be wasted when updated versions of repository platforms are released. Solutions might include the modularization of repository platforms combined with the promulgation of consistent and stable standards and APIs.

In her article, Salo suggests that some repository software platforms need to be more responsive to specific institutional requirements, for example with regard to things like mediated deposit or the batch import of documents. There may also be a need for repositories to interact more closely with a wealth of other institutional systems, which are currently typically based on a mix of proprietary and open source solutions. While a recent report suggests that institutions in the United States (at least) might welcome additional open source development within the higher education sector [14], it might seem perverse in institutional terms to insist that repositories require an open source solution to our long-term problems in curation of our valuable materials within our repositories. APIs do reduce the workload on an individual programmer, which is why many open source solutions also offer APIs. APIs are programming best practices at the moment and are not a viable alternative answer to access to the code itself. At best, APIs in proprietary software offer a temporary and brief – particularly in the lifespan of a repository – opportunity for interoperability with other systems. If a certain service is needed and if only proprietary software with APIs provides that service, then a proprietary solution might be considered to bridge that gap in service. But even then, a plan should be put in place to develop and migrate to an open solution.

For a long time, it has been argued that the market, as represented by proprietary software solutions, is more responsive to the needs of users, to new requirements and to innovations. Open source is now seen as a diverse infrastructure of solutions each in competition while also free to borrow from each other. The large number of Linux distributions most obviously testifies to this diversity. The core pieces of work are borrowed, remixed, reincorporated and revised into new specialized versions of the Linux operating system making it one of the most innovative software ecosystems in the world. It is no mistake that Stephen Weber’s *The Success of Open Source Software* [5] was 2004 winner of the Professional/Scholarly Publishing Annual Award Competition, Computer and Information Science. Weber explains how competition and cooperation flourish in open source by driving a market for innovation that is closely tied to customer satisfaction and customer participation rather than customer lock-in.

Indeed the strong market presence of open source has even converted some of its harshest critics. Recently Sun Microsystems leader Scott McNealy was quoted [6] as saying,
Negative, from page 24

solution, while course management or library management systems are free to follow the proprietary path.

Finally, and perhaps most importantly, the insistence that institutional repositories should always be built on open source software – regardless of context – would seem to be unnecessarily focused on the means rather than the ends. The purpose of any repository should be the stewardship of well-managed collections of institutional content. Therefore, any focus on openness should be concentrated on making sure that repository content and its associated metadata can be exposed to other systems through tools like the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) and that both content and metadata can be exchanged successfully between repositories and other systems. In the same way that repository technologies will change over time, these interoperability mechanisms will also need to evolve to take account of new opportunities for sharing data. The experience of some data science domains suggests that there is a need to focus a great deal of attention on adherence to open standards and on the development of stable APIs, as well as on shared approaches to semantics [15].

To conclude, where open access is the main objective of an institutional repository, the exact license status of the software that underlies it does not seem particularly significant. While the statistics from OpenDOAR suggest that most repositories are currently developed on open source platforms, a growing market for outsourced solutions exists, including for those provided by the commercial sector. In the longer term, however, things could become even more complex. For example, institutions could contract out some core repository functions to third party services based in the cloud [16]. Simultaneously, however, repositories are also likely to depend increasingly on their tighter integration within a more complex set of institutional systems and processes (for example, as part of research workflows) and in many cases linked to national and international research e-infrastructures. The open source development model is likely to have a very significant role to play in helping to develop and link these complex infrastructures, but other approaches will still remain viable.
Resources Mentioned in the Topic 3 Debate


Institutional Repository Success Is Dependent Upon Mandates

Affirmative Argument

Steve Harnad
School of Electronics and Computer Science, University of Southampton
Email: harnad<at>ecs.soton.ac.uk

The institutional repository (IR) movement is an outgrowth of two movements that preceded it:

1. Open Archives Initiative (OAI) [1], which designed the OAI Protocol for Metadata Harvesting in order to make all (what eventually came to be called) institutional repositories interoperable – so their distributed local contents could be treated as if they were all in one global repository.

2. Open Access (OA) [2] movement, which defined the primary target contents of IRs within academic institutions (refereed research journal articles) and the fundamental reason for depositing them (to make research freely accessible to all would-be users online so as to maximize research uptake, usage and impact).

There are, of course, many other kinds of things one may wish to deposit in IRs (such as unrefereed drafts, courseware, data, multimedia or software), and there are similar repositories associated with different types of institutions besides those of higher education. However, that said, if IRs

Negative Argument

Nancy McGovern
Digital Preservation Officer, ICPSR, University of Michigan
Email: nancymcg<at>umich.edu

I would like to approach this problem by first re-stating it. If we deconstruct the assertion in the topic, it has three components: success, dependent and mandates. How might these three concepts be defined in this context?

Although the term institutional repository itself is a concept to consider in the topic statement, this response accepts the view that the scope of an institutional repository varies by organization and is whatever the organization determines it to be [14].

What does success mean for an institutional repository? Defining success – or success metrics – is a precursor to measuring success. Indicators of success for an institutional repository might include the following:

- **Submissions**
  - *Number of submissions* – a high number of submissions (i.e., digital content that is contributed to the institutional repository by its creator or producer)
  - *Frequency of submissions* – the occurrence of submissions is continuous over time and/or there are increasing submissions from recurring producers
  - *Type of submitter* – broad representation of constituents (e.g., this might mean that faculty at all levels – staff, graduate students and undergraduate students – in most or all departments submit content)
  - *Participation of key stakeholders* – for example, submissions by senior faculty or documentable support from institutional or other funders of the institutional repository


in higher education are to be successful in what was and still ought to be their main raison d’être, then they need to capture their target contents: their own institutional refereed research journal article output. The measure of that success is accordingly the proportion of their faculty’s annual journal article output being deposited in the IR.

The global baseline value for this deposit rate is about 15% according to various estimates, such as Bjork et al (2008) [3]. Institutional repositories within higher education can only be counted as successes if they are ingesting a significantly higher percentage of their institution’s scholarly output, approaching 100%, rather than languishing at the global baseline.

Thanks to large international, pan-disciplinary surveys conducted by Alma Swan and her associates [4], we know that academic authors are favorable to open access, but most will not self-archive until and unless their institutions and/or their funders mandate that they do so. If it is indeed mandated, however, 95% of authors report that they will comply – over 80% of them saying they will do so willingly.

Does actual behavior conform to the self-predictions in these surveys? Although their number is growing rapidly, IRs are indeed nearly empty, languishing at or below the 15% rate for OA’s primary target content: refereed journal articles. There are exceptions, however, namely, the IRs of those institutions that have adopted a deposit mandate (currently about 30 institutions [5]).

Arthur Sale [6] compared the deposit rates of three comparable Australian universities, (a) one with only an IR, (b) one with an IR plus encouragement and help in depositing, provided by library staff and (c) one with an IR, encouragement/help plus a self-archiving mandate. Their

- Use
  - Number of users – many users of the institutional repository, both new and recurring
  - Type of content used – use of the majority of the content in the institutional repository rather than use of only a small portion
  - Nature of use – content in the institutional repository is routinely cited in reports and publications

- Support
  - Constituent support – depositors and users express satisfaction with the institutional repository.
  - Financial support – the institution provides ongoing, and preferably increasing, support.
  - Technical support – there is adequate support for and interest in the development and enhancement of the infrastructure, software and tools required by the institutional repository.

The above are just some of the possible metrics for success that might be considered. To demonstrate success, an organization that manages an institutional repository would have to either promote or document a perception within the institution that an institutional repository is successful or establish a means to define and measure the success of an institutional repository.

What does dependent mean in this topic statement? Dependent suggests that the success of the institutional repository relies upon – solely or in large part – or requires mandates. The statement does not explicitly state, but does imply, that the success of an institutional repository is solely dependent on mandates. Therefore, another way of say this would be that mandates provide the only means for achieving a successful institutional repository.

What do mandates refer to in this context? A mandate refers to the authority or the obligation to do something. An institutional repository might be the authorized or designated repository for all digital content produced by or for the institution. Creators of content that fall within the scope of the institution’s responsibility (however that is defined) might be obligated to deposit content they create or produce in the institutional repository. The latter is more likely to affect the success of the institutional repository, although the designation of an institutional repository should imply the commitment of resources to maintain it.
There are different types of mandates that might have an impact on an institutional repository: a deposit mandate, as discussed in the preceding paragraph; a preservation mandate that might require an organization to provide ongoing access over time to content deposited in an institutional repository, for example; or a confidentiality mandate, requiring an organization to adhere to a range of access control requirements regarding digital content for which it is responsible. For many institutional repositories, there may be the expectation that the content will be preserved without explicit commitment by the institution to do so.

Restating the Topic Statement
Having examined these core concepts in the original statement, we can restate it for consideration in this context:

The obligation for content creators, especially within a sponsoring organization, to deposit content is the prerequisite for the establishment of a well-populated and widely-used institutional repository.

With this understanding of the statement, there are several aspects to discuss, especially regarding the concept of mandates.

Case against the Topic Statement
Preference for carrots. Studies are beginning to show that other factors – for example, incentives, peer pressure, positive outcomes (e.g., increased citations for the content) – may contribute more to success than the stick (mandates). See, for example, the results of a study that looked at carrots (such as value-added services for users, promotional plans or financial incentives) and sticks for institutional repositories [15].

Implications of mandates. Mandates may be difficult and potentially costly to promulgate and enforce. In practice, staff and other resources might have to be used to ensure that the mandate is enforced. Determining the content that should be submitted to an institutional repository may itself be a challenging task. Accomplishing this task may include determining who is affected by the mandate based on the nature and terms of their affiliation with the institution, then determining what content they produce falls within the scope of the mandate. There may be challenges in determining that the whole of the scope of expected content has been submitted depending on the type of persistent identifiers used, if these devices are in place for all of the relevant content types.
Resistance to mandates. Some content creators may not accept the mandate – that is, may not believe the institution has the authority to require that their content be deposited. Based on responses from repository managers who have attended the Digital Preservation Management workshops, for example, some organizations intentionally do not call their implementation an institutional repository to avoid the problem of defining what the “institutional” portion of the term institutional repository includes.

Unfunded mandates. Mandates can be difficult to sustain in the absence of dedicated funding from the institution for which it is implemented. The institution effectively commits to the idea rather than the reality of having the repository. A lack of funding may make it difficult to justify continuing to maintain an institutional repository, especially in difficult financial times.

Competing mandates. In addition, if depositors are allowed to deposit content that does not have a known, feasible or affordable preservation strategy (for example, new types of or complex forms of digital content) and there is an expectation that content will be accessible to depositors and other users over time, this practice could challenge the ultimate success of the institutional repository. Preservation issues regarding institutional repositories are further considered in a forthcoming article[16] in a special issue on institutional repositories.

Re-stating the Topic Statement Again
Considering these factors, the original statement might be again restated:
Success for an institutional repository should be explicitly defined (qualified or quantified) to reflect its organizational context; then appropriate incentives should be determined to achieve what should be the inherent mandate of institutional repositories: to capture (and preserve) designated content to optimize the value and impact of an organization’s digital assets (designated digital content) over time.

Mandates alone – or possibly at all – are not the determining factor in the success of institutional repositories.

H A R N A D , c o n t i n u e d

assent to some form of immediate open access self-archiving, 63% for the final refereed, accepted draft[11]. Moreover, a deposit mandate only requires immediate deposit[12] in the IR, not necessarily making the deposit openly accessible immediately.

If an academic institution stipulates that the procedure for submitting refereed journal articles for annual performance review is for faculty members to deposit them in the institution’s IR, that requirement immediately makes the few minutes worth of work well worthwhile – doubly so given that open access is also likely to increase their citation impact, another factor taken into account in performance reviews.

For the minority of articles published in journals that have not yet endorsed authors making their deposits immediately open access, they can be deposited as closed access, so that only their metadata are accessible web-wide. Institutional repositories have an “email eprint request” button[13] that will allow would-be users to request a single eprint with one click and the author to fulfill the request with one click. None of this, however, is possible without universal IR deposit mandates. Without them, IRs will continue to languish near-empty, as most them are now. Hence institutional repository success is dependent upon mandates.
Institutional Repositories: The Great Debate

HARNAD, continued

MCGOVERN, continued

Resources Mentioned in the Topic 4 Debate


Editor’s note: This article is based on the authors’ presentation at the European IA Summit held in Amsterdam in September of 2008.

The design of a physical space can and should take advantage of information architecture (IA) deliverables, in particular when designing an integrated model of IA across environments. The user must be able to easily consult technology-dependent environments such as digital media or printed paper catalogs in line with the information flow carried through the website. Conveying the relevance of information to the user/consumer by means of applying IA principles with a view to designing a crisscross-connecting model of human-information interaction is the focus of these studies.

Information-sharing experiences span various technology-dependent environments, and these environments are not self-limiting. Let’s reflect on the experience of buying a product. It could start by browsing a particular website or by leafing through a printed product catalog. Similarly, the experience can come about via a handheld device and/or software interface and could end inside the physical retail space of a large chain store or specialty shop.

Regardless of where the experience begins and ends, it is highly desirable that the consumer be permitted to interact in a seamless manner and that no information flow fractures be apparent. Continuity can be provided by a structured, bridge-like experience. It follows that the users can keep the same mental model through each step of experience, which will provide a homogeneous model of interaction [1]. Bridge experiences synthesize this process by identifying continuous passages of information

- from one web or software environment to another
- from the web to a software environment
- from a software environment to a hardware environment
- from the web to a physical environment.

In his article, “Design for Bridge Experience” [2], Joel Grossman asserts that bridge experiences involve situations in which people must traverse different domains in order to communicate successfully, complete a task or elicit a desired physical, mental or emotional response.

The evolution of IA leads to a crossing and integrating information architecture, a component of the bridge between various user experiences. This passage is highlighted by the definition of IA in the third edition of Rosenfeld and Morville’s Information Architecture for the World Wide Web [3, p.4]:

- The structural design of shared information environments
- The combination of organization, labeling, search and navigation systems within websites and intranets
- The art and science of shaping information products and experiences to support usability and findability
- An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.

In this article we illustrate the principles of bridge architecture with two studies of how websites and physical environments might be integrated. The studies were not sponsored by the enterprises described. Their aim, however, is to show possibilities, both realized and potential, within real environments. Erika Salvini’s study was a class project for Information Architecture and Knowledge Engineering, a course taught by Luca Rosati at the University for Foreigners of Perugia (Italy) in 2007/2008.
Apple’s Integrated Information Architecture (David Potente)

Close analysis of the Apple website and, in particular, the Apple Retail Store highlights the role of information architecture in building bridge experiences. IA can cross various contexts of experience with the objective of defining a unique human-information interaction model by means of proper organization of information flows and tasks.

**Apple bridge experiences and crossing IA.** The website and the store share a common information organization, despite their obvious and necessary interface differences (Figure 1).

The navigation bar in the menu shows the following tabs:
- **Home** (logo Apple)
- **Store**
- **Mac**
- **iPod+iTunes**
- **iPhone**
- **Download**
- **Support**

Product organization follows standard guidelines throughout the worldwide network of Apple stores. On entering a store this consistency is noticeable in the following specifically organized areas:
- Mac computers
- iPod and Apple TVs
- iPhone

![FIGURE 1. Map of correspondences between Apple website taxonomy and product placement inside the Apple Retail Store](image)

<table>
<thead>
<tr>
<th>TABLE 1. Comparison between the Apple website IA and Apple Retail Store IA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home</strong></td>
</tr>
<tr>
<td><strong>Store</strong></td>
</tr>
<tr>
<td><strong>Mac</strong></td>
</tr>
<tr>
<td><strong>iPod+iTunes</strong></td>
</tr>
<tr>
<td><strong>iPhone</strong></td>
</tr>
<tr>
<td><strong>Downloads</strong></td>
</tr>
<tr>
<td><strong>Support</strong></td>
</tr>
</tbody>
</table>

Table 1 compares the two organizational structures. This organizational solution is a good example of efficiently and effectively crisscrossing IA between two environments, the web and the physical retail space (Figure 2: Apple Retail Store views).

Inside the store, LCD video screens might be provided in the particular areas to demonstrate the products on sale, their specifications and any related accessories – highlighting products corresponding to the visited area of the store. Inside the dedicated Mac area (Figure 2.1), computers are displayed. Likewise,
evaluate needs to which they were previously oblivious. Specific products or services can be suggested as contextual content on the video screens with the aim of encouraging customers to deepen their research. In this way the same information can be retrieved following various information paths through a multidimensional approach.

Customers can identify various paths to follow a specific information need. These paths cross the web and video screen interfaces and the physical retail spaces. The information-seeking process can thus be considered an example of evolving transversal research that is satisfied only by a final set of conclusive information in relation to a specific topic, rather than by various references and information gathered step-by-step (berry-picking process). Users may thus refine and deepen the process at every stage of their research [4].

Information scent and colored t-shirts. Colored t-shirts worn by staff have recently been introduced in all Apple Retail Stores. Each color is representative of a specific duty and department:

- light blue t-shirt: specialist
- dark blue t-shirt: creative and genius
- orange t-shirt: concierge
- polo shirt: business partner
- black t-shirt: stockroom staff

Incorporating a strategy of colored t-shirts can be considered an effective way to convey the crisscrossing of information. If we visit the Apple Store webpage (www.apple.com/retail/) suggestions to improve our shopping experience can be found. For example, we can find answers to our queries by addressing our questions to the staff in the orange (concierge) t-shirt. This type of cue emanates from the website, but it will also prove useful in the physical retail space, as it crosses two different contexts, the web and the real world, and it allows us to perceive the simplest path to follow to access the information we need.
Similar cues can also be introduced for other competencies to ensure that the user easily recognizes the right staff member inside the physical retail space to satisfy an information need emanating from the web. This device is a powerful example of bridge experience. On the Apple website every product could be followed by replicating the color combination used for the staff. In this way purchasers know to whom to address their questions in order to have further information about a product, how to use it and suggestions about other products. A key or legend explaining the color combination should be shown at the bottom of each product’s page to avoid information overload. Colors are an efficient and effective mechanism for conveying a circular and linear flow of information between different conceptual contexts.

**Content as a component of bridge experience.** Bridge experience is defined by a unique mental model the user can keep through a range of concepts, thus ensuring homogeneous interaction. To convey this homogeneity, people need signals and cues connecting the digital world to the physical space. Textual contents can offer a great help to obtain this consistency.

Textual labels, icons and symbols work as signals both in the realm of the web and within physical retail space. The way these signals communicate with people can show consistency through contexts of experience. For example, the box “Shopping Tips from the Apple Store” (www.apple.com/retail/) shows a particular style of communication – warm and close to its users yet not overly confidential.

Content design determines the creation of a closely linked connection between the experience encountered via the web and that of the physical. Web-posted suggestions aim to provide the user with a high-level browsing experience, as close as possible to the one that the customer finds in the physical retail space. Such attention to detail means that the communication mode (electronic for the web or print for the physical retail space) and communication style (advertisement offers and/or posters) together with its content (fonts, titles, short paragraphs, labels) must always be consistent to facilitate and promote clarity in the eyes of the user/consumer.

Micro-content design (titles, paragraphs, labels) must reflect the customer’s point of view. It is very important to offer clear content that, with symbols and icons, conveys that type of crisscrossing of information between contexts of experience. These elements perform an important function for wayfinding strategies between the web and the physical retail space.

**Redrawing the map: From page description diagram to area description diagram.** Page description diagrams (PDDs) allow for the description of content areas of a web page in prose, as in a functional specification. Specifications are arranged following an order of priority and can be followed by mini-layouts to give more details about a specific feature on the page. A PDD is thus valuable for showing priorities and defining a context by providing useful information on content and functionality for the visual design of every single page. An example of a PDD is shown in Figure 5.

On this PDD high fidelity mini-layouts are shown in order to provide a clear document, using existing parts of web pages to obtain mini-layouts. In an ordinary design project, PDDs are developed before wireframes are drawn, but we are able to replace these layouts with those of a lower fidelity.

The purpose of the area description diagram (ADD), on the other hand, is to establish an environment for content and functionalities in a physical retail space. It is a useful deliverable for bringing information architecture from digital to physical environments. Figure 6 shows an example of an ADD for an Apple Retail Store. It suggests conveying IA principles to provide a retail design that is part of the crisscrossing model of human-information interaction.

On the ADD we can show information about product placement inside the store. In the same way it is possible to highlight relevant areas where specific support services are provided, such as help-related information,
This model (Figure 8) shows two relevant connections between digital and physical environments:

- Users can visualize products using the scroll bar, and by the same means they can look for Mac computers, accessories and applications grouped together in contiguous areas inside the store.

- Information design used within the Mac webpage is identifiable within the Apple Retail Store, as shown in Figure 9. Each area finds its equivalent on the web and vice versa:
  - Grey area (overview): an overview on the website relates to shelves showing Mac computers within the store
  - Purple area (what I can do?): the section “Find out how to get more out of your Mac,” showing software solutions and tutorials on the web relating to a specific area where software solutions are shown on display racks
  - Orange area (help): learning activities and support are provided on the website and

Considering other sections of the Apple website, like the one related to Mac computers, it becomes possible to analyze further connections between digital and physical environments. The webpage shown in Figure 7 can be divided into three sections. At the top of the page a horizontal scrolling bar can be used to browse among Mac computers, accessories, applications, servers and Wi-Fi devices. This solution provides an immediate overview regarding the main content material available in this section and recalls the product’s physical location within the Apple Retail Store. Depending on the store’s features, the connection between digital and physical environments is provided using different types of shelf placement.
within the store. The staff can be considered as part of a specific area by providing their competences and offering content to customers in the same way contents are provided on the website. The experience with personal training, workshops and support starts on the web to end at Apple Retail Store.

The same model could be applied to the iPod+iTunes webpage and corresponding physical space inside the Apple store. There is a strong level of coherence when compared to the previously mentioned analysis. The iPod+iTunes webpage replicates the information design from the Mac webpage. Adapting the model shown therein it is possible to identify the same human-information interaction model:

- Users can visualize products using the scroll bar, and by the same means they can look for iPods, Apple TV and accessories grouped together in contiguous areas within the Store.
- Information design used in the iPod+iTunes section (www.apple.com/itunes/) is identifiable within the Apple Retail Store (Figure 10). Each area finds its equivalent on the Web and vice versa:
  - Grey area: an overview of the website relates to the display shelves showing iPods and Apple TVs inside the store
  - Purple area: the section “Featured on iTunes” together with “Tutorial+Tips” and “Accessories” on the web relate to a specific area where accessories are shown on the display racks
  - Orange area: within the iPod+iTunes webpage, links are not provided to learning activities and support. The staff offers advice and information on products provided in this area of the store, so it could be useful to provide information about workshops and support on the web in order to convey a bridge experience between these environments.

Organizational and human-interaction models are thus being merged in a unique process conveyed through a clear bridge experience. Users will therefore receive a seamless and continuous experience between the digital and the physical environments.

Individual web pages like “Mac” and “iPod+iTunes,” each with its related physical areas, reiterates the organizational system noticed for the homepage and the overall design within the store. The corresponding PDD could be superimposed on the Mac’s ADD or on that of iPod+iTunes, which means there could be a continuous, reciprocal recall mechanism between the macro-architecture and the micro-architecture both on the website and within the retail store.

This adaptability to different conceptual contexts is proof and further testifies to the integrated information architecture and organization of information flows and tasks obtained by crossing digital and physical space and thus conveying a unique human-information interaction model. Through these ADDs it is possible to verify that the Apple Retail Store is representative of the entire Apple website and vice versa.
IKEA's Integrated Information Architecture (Erika Salvini)

This case study illustrates how bridge experiences help individuals get access to information. The analysis focuses on IKEA's catalog and retail stores. We have considered the Florence retail store, but the results can be valid globally. The main goal is to develop a unique organizational scheme for the entire system, starting from the product catalog, which is better organized than the website.

IKEA offers a wide range of products at affordable prices. Customers are actively involved in the shopping experience. They begin by choosing their products at home on the website or in the paper catalog. They then collect their products at the store and assemble the items themselves following the instructions. This idea of collaboration has been summarized by the following slogan: “You do your part. We do our part. Together we save money.”

IKEA's strategy toward buyers aims to induce them to feel part of a whole evolutionary process termed “experiential shopping.” In order to reinforce this strategy, IKEA shows hundreds of inspirational displays providing fresh ideas with product combinations, contemporary interior design suggestions and the possibility of product testing. In this way customers perceive a strong emotional experience.

Moreover, the interaction between physical and digital worlds is already provided by the website and virtual interior design facilities access. The website allows shoppers to consult the range of products to be aware of periodic offers and extra services. The virtual design planning allows customers to act as interior designers.

The target of this project. The problem addressed in this study is the absence of a unique and coherent human-information interaction model. IKEA's actual approach to information is managed in different ways, according to the context: the product catalog, the website or the retail stores. The aim is to address this weakness by suggesting the reorganization of their information in a crossing way. According to the IKEA concept, the shopping experience can be considered a circular process – it starts and ends at home. For this reason, it is even more important to create bridge experiences, which facilitate the passage from one domain to another.

The catalog. The annual catalog shows the range of products for sale, related technical guides and the extra services information. It is built on a hierarchical-numeric classification: 15 classes highlighted by different colors and relative subclasses.

From analyzing this taxonomy we can detect several different criteria or attributes used for each hierarchical level:
1. Rooms linked to products’ allocation
2. Customers to whom products are addressed
3. Products’ materials
4. Use of products
5. Sort of furnishings
6. Other

The interference of different categories causes repetitious displays of products. Moreover, some subclasses have no hierarchical relation with related classes (for example, flooring is catalogued under Textiles), and labeling imprecision, found in the Italian catalog, causes confusion and doubts as well.

A matter of coherence. After the previous analysis, we can affirm that the catalog’s information architecture is incoherent and chaotic from a point of view of classification theory. However, beyond this consideration, it is important to check if this classification works anyway for IKEA customers and if it is suitable for the IKEA context.

FIGURE 11. The IKEA catalog categories
The main catalog’s classes are created on the basis of customer demands and human cognitive models. For examples:

- A potential buyer looking for a double bed will normally refer to the class “Bedroom.” But if the same customer wants to buy a cot for his baby, this same category wouldn’t be so obvious. The class “Children’s IKEA,” in this case, is a more appropriate reference.
- The “Textiles” class has been created to help a reader find certain items like curtains, which may be difficult to locate because they are potentially linked to different rooms.

Further, the categories’ order follows the degree of importance: The first ones are the most marketable according to business strategies and sales. These new considerations enable us to notice that, even if theoretically scrambled, the taxonomy is perfectly coherent from the empiric-pragmatic point of view, which is the most important issue to make the information retrieval easier.

**Suggested catalog redesign.** In order to overcome other catalog weaknesses, it’s important to do the following:

- Create clear and suitable labels in appropriate language
- Establish subclasses for each class that respect human mental associations
- Avoid class crossover

The improvements in the redesign of the catalog should be placed at both hierarchical levels. Concerning the principal classes:

- “Kitchen” and “Dining” categories could be combined inside the retail store, since people usually associate them as a matter of space; someone who decides to buy furniture at IKEA probably is not the owner of a big, luxury house.
- More attention should be paid to imprecise label translation (found in the Italian catalog), which may lead to misunderstandings and wrong interpretations.
- The “Buying guides” category at the end of the catalog should be eliminated. The technical information would be more easily consulted if it were attached at the end of each category.

Considering the second level, some subclass relocation in different categories would help to respect human mental associations and hierarchical relationships. For example:

- Living Room – sofas, sofa beds, coffee tables, TV solutions and storage
- Kitchen and Dining – units, door styles and handles, interior fittings, planning and pricing, free-standing kitchens, storage and accessories, tables, chairs, stools, cabinets and dining sets
- Bedroom – beds, collections, wardrobes and chests, mattresses, pillows and quilts
- Youth Room – beds, storage and solutions
- Children’s IKEA – furniture, toys, nursery, baby, children’s rooms, textiles and storage
- Home Organization – heavy-duty storage systems, boxes and small organizers
- Workspaces – desks, chairs, drawer units and storage
- Bathroom – units, cabinets, free-standing designs, organizers and accessories
- Textiles – bed and bath, design collections, curtains and blinds and rugs
- Cooking and Eating – tableware, food storage, pots and pans and cooking accessories
- Lighting – table lamps, floor lamps, ceiling lamps, shades, bases and cords
- Decoration – vases, plant pots, candles, wall decorations, mirrors and flooring
- Information – guarantees, special offers, IKEA Family, financial services, shopping at the store, services, stores and maps, index, restaurant

Towards a crossing and integrated information architecture. To obtain an integrated model of IA we need to do the following:

- Use the same product’s classification in the three domains (paper catalog, website and retail store);
- Set the same distinctive color proper of each category in all three domains.
The website has several menus with different categories from the ones in the catalog. The main navigation menu displays only the most popular classes, and some of them have different labels. Hierarchical relations are not observed: classes and subclasses are shown at the same level. Though each product can be reached from different paths, links that provide this access are imprecise. As a result we have a chaotic heap of information that may confuse the potential buyer. In the same way the retail store does not observe a common product classification, although crossing information architecture is important to improve the customers’ shopping experience.

For this reason, the use of the same distinctive color in each environment would help customers recognize immediately the class of product they are looking for. In order to highlight a crossing reference between contexts, colors can be used for the main menu’s buttons on the website and also for the entrance walls and floors of each department of the retail store. (Interior walls and partitions of the store must be kept in white because they are frequently used as background of realistic room settings.)

Moreover, to realize an information architecture that would be even more transversal, some of the advantages of the web could be transferred to the retail store. We suggest three interventions:

- More ways to access departments, following a sort of faceted classification;
- Use the collection of maps and information points to make customer mobility easier, to make them aware of their position inside the store (wayfinding) and to let them be aware of the way they’ve walked through it (breadcrumbs);
- Install LCD screens in the central area, showing products and offers with pertinent characteristics and giving information on the items’ pick-up-point area (findability).

The actual internal path within the store is obligatory. Customers are constrained to begin their tour from the first floor, going through all departments towards the storehouse to finally reach the cashier desks on the ground floor. There is no possibility of detouring. This path creates a delimited running flow that may prevent visitors from going back to look over a product. Obviously, this kind of interior space design is based on a market strategy grounded on customers spending time inside the store – the possibility of seeing the whole range of products should induce clients to buy more.

Such an assumption may be partially true, but it is not scientifically proved. An obligatory path could be too long and boring. Usually IKEA stores are crowded, especially on weekends, when shopping experiences become quite stressful. To avoid this problem one could provide separate access to floors and direct access to departments, still maintaining the possibility of a whole exploratory route for people who like spending some hours inside the store. Moreover the aim of the market strategy could be reached anyway by maintaining a low-cost products display close to the storehouse and in front of cashier desks. In this way, even hurried or distracted customers could be tempted to buy those items.

Pocket maps are available at IKEA’s entrance. They are very useful because they concretely help customers to find their way inside the store. I propose to add information panels at the entrance to indicate the departments found on each floor. Each department would be distinguished by its specific color.
Furthermore, I suggest installing an LCD screen in the central area of the store to improve product findability. On the homepage, offers would be highlighted and the catalog categories would be displayed using their respective colors.

**FIGURE 14. Example of LCD screen homepage**

“Too often as designers, we think about users as “static” entities… rather, today users always move “across” something…”[5]

**Conclusions**

As shown in the case studies users collect information on the web and use it in the real world and vice versa. These considerations emphasize the role of users and their evolving needs: People can improve the design process by making suggestions about what they need in terms of functions and content, also about the way they recognize information and interact with it. From websites to retail stores, from digital interfaces to physical ones, why would not users play a more proactive role in the overall design and the consequential bridge experiences they create and crisscross in everyday life? Participatory design strategy is the answer because it offers an approach to design that attempts to proactively involve the end users in the design process and help ensure that the product designed meets their needs and is usable.

**Resources Mentioned in the Article**


**Resources for Further Reading**


Resources for Further Reading, continued


Web 2.0 Applications of Geographic and Geospatial Information
by Alan Oxley

This paper covers the topic of Web 2.0, focusing on the use of geospatial and geographic data. Web 2.0 has not arisen due to a major change in technology. The label Web 2.0 applies to recently developed types of web applications and ways of using the web; however, advances in technology, such as the extensive use of XML, have enabled them.

The type of web applications that are available – and which ones dominate – has been transformed as have the ways that people use the web. For example, Web 2.0 allows users to keep track of items of interest. For years users have noted their favorite web pages. Now they can give tags to their favorite pages, photos, videos or other items as part of an interactive, social network. More formally and more pertinently to our topic, items can be geotagged, giving their physical location. Individuals can also make maps for their own use. Finally, the ease with which programmers can access information from websites using “services” has also led to the development of mash-ups. A mash-up is a web application created by mixing the information from two or more sources. Many existing data mash-ups involve data available from map sites.

In this paper we will look at both the Web 2.0 technologies and applications in somewhat more detail. We will also consider the critical area of geographic data standards and the availability of public-sector geographic data, particularly in the United Kingdom. Finally, we conclude with some developments that are likely in the near future.

Technologies that Support Web 2.0 Geographic and Geospatial Applications

While Web 2.0 may not be only about technology, hardware and software changes have nevertheless facilitated it. In their recent book (Unleashing Web 2.0 [1]), Vossen and Hagemann call these changes the technology stream of development. Specifically, they include the development of Ajax, PHP, Flash, XML web services and web procedure calls and syndication, among others. We will briefly describe these technologies.

Static web pages have given way to dynamic ones. For instance, Ajax enables just a portion of a web page to be downloaded from a server. Formerly, if anything changed on a page, the whole page had to be downloaded. Another factor in the development of dynamic web pages has been the development of the scripting language PHP, while Flash is an animation technology that takes up relatively little bandwidth and also makes page content dynamic.

In addition, data can be shared between websites by putting it into a format such as XML (Extensible Markup Language). XML files look like well-annotated databases. They are easy to look at and understand. Freedman [2] gives an example of storing the details of music albums.

Alan Oxley is in the Computer and Information Sciences Department of the Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia; he can be reached by email at alanoxley<at>petronas.com.my
Returning to Vossen and Hagemann, the application stream of development is the name they give to changes in the types of web applications and services that are available and to changes in which web applications dominate – as opposed to the technology stream mentioned above. A range of services has been developed for use over the web and that allow one computer to access information on another one. These web services transfer information in XML format. There are three parties involved in the utilization of web services as illustrated in Figure 2.

1. The service providers make their web services known to a registry. Typically the standard for exchanging this information is the Universal Description, Discovery and Integration Standard (UDDI).
2. The client looks for a service in the registry (using UDDI).
3. The client pulls a description of the service from the provider. Typically the standard for exchanging this information is the Web Service Definition Language (WDSL).
4. The client requests information, and the provider supplies it. Typically the standard for exchanging this information is the Simple Object Access Protocol (SOAP).

Sometimes the above model is not adhered to when transferring information from the provider to the client. For example, a provider may not advertise the service in a registry. In these cases we do not use the term web service; instead we call them web procedure calls. The increased availability of free APIs has led to the development of mash-ups, a new type of web application created by mixing the information from two or more sources. Mash-ups can be created relatively quickly by interacting with APIs via procedure calls.

Finally, syndication is an example of another key feature of Web 2.0 contributing to the improved functionality of web applications. Using syndication, content such as news headlines or information from retailers can be inserted onto many websites. These are called RSS feeds. (There is more than one interpretation of what “RSS” stands for. One interpretation is “really simple syndication.”) When information to be sent over an RSS feed is converted to RSS format, it looks much like XML. A similar phenomenon is podcasting where a user subscribes to a service that provides audio or video files to a portable device or a PC.

Types of Geographic and Geospatial Applications in Web 2.0

Vossen and Hagemann refer to changes in how people use the web as the “user participation and contribution stream” of development. Users now no longer simply receive information – they create it. A main feature of Web 2.0 is the social interaction that is taking place. This includes the use of wikis (created by users collaboratively) and blogs, the sharing of videos and the use of websites based around individuals giving their comments. Another feature of Web 2.0 is tagging.

Geotagging. Tagging is a widely used social feature of the web. Web users can rank content, as is done in a number of websites. On the Digg website [3], for example, users submit content and other users say if they “dig it” (like it). An overall ranking is thus formed. Indeed, a major feature of Web 2.0 is the power afforded to ordinary users when they act collaboratively.

If users engage in assigning tags to resources, they are said to be creating a “folksonomy.” Any website will have numerous tags associated with it that have been assigned by the different users. It is possible to have a pictorial representation showing the frequency with which tags are used for a particular website. Such a display is referred to as a “tag cloud.” An example can be found at www.flickr.com/photos/tags

In addition to the free use of tags by general users, items can be tagged by more formal means, by adhering to a standard. The Geotagging format is one such standard. It is used to specify the geographic location (latitude and longitude) of an item. Example websites where user information is geotagged include Flickr [4] (photos), Wikipedia [5] (articles and their photos), Upcoming.org (events and things to do), Weather, the U.S. site Traffic and
Yahoo’s Local Search site. Some websites such as Flickr have a built-in map display, such as Flickr [6].

Mapping. Using Web 2.0 features, some individuals make maps for their own use (neography). On the social networking site MySpace [6] it is possible to map the location of one’s friends (see ProfileMaps.info [7]). In another application, a group of friends can see where each other is located by displaying a map with markers, on their mobile phones (see plazes.com).

This activity is facilitated by the availability of hardware and software, some of which is low-cost, including high-speed digital cameras, handheld GPS location equipment, vehicular SatNav and digital compasses. As far as handheld location equipment is concerned, there are low-cost Bluetooth GPS receivers that can transmit to a PDA, mobile phone or laptop PC. Some PDAs and mobile phones have GPS built into them. A full 3D orientation of a mobile user can be created from the combination of a GPS receiver, a compass and tilt sensors (or gyroscope). A geo-wand is a device that uses 3D information to identify geographic objects by pointing at them. Knowing the location and orientation of the user, a database is consulted in order to identify the object. Simon and Fröhlich [8] developed a system comprising a sensor-equipped mobile phone, a geo-wand and software, which they used to identify buildings they pointed to in a city center.

A large amount of software exists, including Google Maps, Yahoo! Maps, Windows LiveSearch Maps [9], Google Earth, NASA World Wind, Open Street Map, Ask Maps, Map24 and MapQuest [10].

Mash-ups. A mash-up is a new type of web application created by mixing the information from two or more sources. For example, traffic data from one site could be acquired while mapping data could be retrieved from a second site. The resultant site could give some pictorial representation of traffic congestion. There are several collections of existing mash-ups such as at gallery.yahoo.com and www.programmableweb.com

Many existing data mash-ups involve data available from the search engine providers Google and Yahoo! In order to affect a mash-up a programmer needs to write code. For the information contained in a website to be accessible to a programmer, the website must have the necessary interface to make procedure calls, an applications programming interface (API). Freedman [2] gives an example of retrieving data using the Yahoo! Maps API. This can be illustrated by entering the following URL [11] into a browser.

```
http://api.local.yahoo.com/LocalSearchService/V3/localSearch?appid=WroxYahooMaps&query=pizza&zip=60609&results=1
```

The first part of this URL gives the location of the API. In this case we are requesting from the server the details of pizza cafes in U.S. zipcode 60609. The server extracts this information from its database. It also converts the zipcode into latitude and longitude or “geo-codes” it. The information is then written in XML code and sent to the client. The client’s browser displays the XML code. In practice the URL will be called from within the web page code and the returned XML code would be processed to, say, place a marker on a map. Details of the Google Maps API can be found at [12]. Before making use of it one must sign up for a key.

There are other examples. GeoURL [13], for instance, is a website that lets you see other websites that are close to a given location by assigning geotags. (It is possible for software to automatically assign a geotag to an item by, for example, reading the text and looking for a place name). Trippermap.com, Stamen Design’s website [14], and Fotoland [15] are also mash-ups, in this case, of Flickr and Google Maps. They can plot a map showing the location of photos provided that each photo is tagged with a place name.

Standards and Policies Regarding Geographic and Geospatial Data

The traditional providers of geographical information systems have standards. Those investigating issues related to digital data include a collection of user organizations, the Open Geospatial Consortium (OGC), the International Standards Organization (ISO) and various government bodies. The relevant ones in the United States are the Federal Geographic Data Committee (FGDC) and the National Spatial Data Infrastructure (NSDI) program.
The OGC comprises hundreds of organizations from both the public and private sectors. One of its achievements is the definition of the Geography Markup Language (GML), for specifying how geographic objects should be defined in website programming code. A group that works closely with the OGC is ISO TC/211, a standard technical committee within the ISO for digital geographical information. The standards produced by OGC are often identical or very similar to those produced by the ISO TC/211. The standards used for geospatial web services are quite different than those for non-geospatial web services. Zhao, Yu, and Di [16] review the standards for geospatial web services.

Discussions have taken place between Google, the Ordnance Survey (United Kingdom) and others, into possible standards for use with new technology. (The Ordnance Survey is the United Kingdom government body responsible for mapping.) The IT community and users need to know what standards can be applied to open data, mash-ups and user-created content. The community will attempt to suggest how an institution can decide which geo-data services to use based on compliance with standards. The British government’s Information Fair Trader Scheme, of which the Ordnance Survey is a member, sets standards for the reuse of information in the public sector.

The topics that must be considered in setting geographic and geo-spatial data policy include trust, provenance, access to data, longevity, IP rights and data accuracy. There is also the potential problem of changes to software. The question of how continuity of access to data can be maintained in the face of software revisions needs to be addressed. Potentially, networking problems could occur if mash-ups are prevalent.

Availability of Government-Produced Geographic Information with Reference to the United Kingdom

Due to technological advances, tools have now become available for individuals and small organizations to reuse public sector information. The British government is interested in maximizing the value of online information to citizens and government departments. In theory it wishes to collaborate with the contributors to user-generated sites, work out how public information can best be supplied and protect the general public. One way it intends to help user-generated sites is to look at the licensing of information to ensure that it encourages innovation, especially when information usage is not for profit.

Let us consider the role of the Ordnance Survey (OS). In today’s society it is essential to have high-quality maps, including a clear definition of the area covering each postcode and a clear definition of who owns what land. Key activities that depend on the reliability of this information include the delivery of products to a property and the rental or transfer of ownership of a property. The Ordnance Survey’s OpenSpace project, created in 2006, is an example activity by the government in its efforts to supply public information. It is intended as an experimental service in open data formats for non-commercial use, but it has not been launched.

There would be benefits to releasing OS data to individuals and small organizations for free. Firstly, there would be increased usage of the data. The South African Mapping Agency had a 500% increase in the usage of its data when it stopped charging for it. The extensive use of Google Maps in data mash-ups is, no doubt, due to the fact that developers can use it freely for non-commercial purposes. Secondly, non-commercial use encourages innovation. Thirdly, if launched soon, the OpenSpace project could serve as a pilot project for future non-commercial licensing of government data.

In practice, the government normally charges very little for providing public sector data that others wish to reuse. There are exceptions though, and these are termed trading funds. The OS, which costs approximately £60 million a year to run, is a trading fund. It is the largest trading fund by revenue. It funds almost all of its operations from commercial revenue, although half of this revenue comes from use by different parts of government. The question that is being asked is “Who should foot the bill?” The OS’s OXERA study claimed that the OS’s activities underpin £100 billion per year of U.K. economic activity. There is a huge difference then between the running costs and the claimed economic benefits. If the current way of charging for OS data is inhibiting economic activity, then activity would only have to increase by a tiny amount for it to offset the £60 million costs. This and other arguments given by Mayo and Steinberg [17] suggest...
that consideration should be given to removing its status as a trading fund. If this were done the taxpayer would foot the bill. Mapping agencies in the United States, South Africa and Canada, for example, make their data available to commercial and non-commercial users free of charge. In the light of this and the other reasons discussed above, they recommend that the OS should launch the OpenSpace project.

The Future

Examples of technological developments that are likely to affect the web within the next five to 10 years include the following:

- **GeoTracker** [18], a mash-up between an RSS publisher such as Yahoo! News or Google Video and Google Maps. The user is presented with a map having pins on it corresponding to where events are taking place. The user can hover his/her mouse above the pin to get a brief description or click on the pin to get detailed news in the form of text and, sometimes, video. With GeoTracker it is possible to look at a period of time – a day or a week, say – and move a sliding bar from the start of the period to the end. The user will be able to see the pins appearing as the news was reported and, in the case of multiple reports from the same location, the pins are color-coded to indicate the frequency of the reports.

- Microsoft Research’s project **Composable Virtual Earth**, which is looking into the inter-operability of map mash-ups

- **Geo**, a draft standard for specifying latitude and longitude of a web page in HTML code. Other websites can read this information and process it by, for example, displaying a map of the location. There is another draft standard called **GeoRSS** for embedding the latitude and longitude into the code of an RSS feed. A browser displaying the feed can read the information and display an appropriate map.

- Developments in open source geospatial applications

- Sensor-based geographic information systems

- Virtual reality mirror worlds.

Also important is the continued development of software engineering (SE). Broadly speaking, SE has evolved from structured programming to object-oriented programming to component-based SE to service-oriented architecture (SOA). With each change there has been a higher level of abstraction. The potential of SOA is yet to be realized. It promises to dramatically affect how the web is used. The aim of SOA is to make it possible to create a website that makes use of the services offered by two or more existing websites. For example, one could develop a holiday planning website to organize an array of details and constraints specified by the holidaymaker such as the following:

- Departure and arrival dates
- Grade of hotel
- Size of car to be hired
- List of excursions
- List of plays, cinema viewings

The holiday planning website would make use of existing websites that focus on each aspect of the trip: air travel, hotels, car rental, public transport and so forth. Such planning websites already exist; however, the various constituent websites were designed to interact with one another. With SOA the intention is to make it possible to develop a value-added website from constituent websites that have been developed independently. Mash-ups can be regarded as the forerunners of website combination before more formal SOA frameworks have been established.

Conclusion

Many Web 2.0 applications are incorporating geographic and geospatial features creating tagged data and also mash-ups, which involve combining data from more than one source using APIs. This rapidly evolving area poses both hardware and software challenges. However, the major challenges are institutional, for example in standards development and data policy. Web 2.0 geographic and geospatial applications will also affect not only how individuals operate, but also many institutions and the agendas and methodologies of research in the hard and social sciences. We look forward to rapid and significant evolution in this area.
Resources Mentioned in the Article

Authors who choose to do so prepare and submit these summaries to the editor of the *Bulletin*.

**From JASIST v. 60 (1)**


**Study and Results:** Taking *Angewandte Chemie International Edition* and the *Journal of the American Chemical Society* as examples, the study examines the publication and citation impact profiles of both journals across the sections of the bibliographic database *Chemical Abstracts*. The findings suggest that a single measure of journal citation impact such as the Journal Impact Factor published by Thomson Reuters is insufficient for characterizing the significance and performance of multidisciplinary and wide-scope journals. The findings show that the information available in the *Science Citation Index* is a rather unreliable indication of the document type and is therefore inappropriate for comparative analysis of journals. The findings further suggest that the composition of the journal in terms of contribution types, the length of the citation window and the thematic focus of the journal in terms of the sections of *Chemical Abstracts* has a significant influence on the overall journal citation impact. For the comparison of multidisciplinary and wide-scope journals more sophisticated methods such as publication and citation impact profiles across subject headings of bibliographic databases (for example, the sections of *Chemical Abstracts*) are therefore valuable.

**Limitations:** A high quality of indexing information is a prerequisite for the applicability of a subject classification scheme to comparative analysis.

**From JASIST v. 60 (2)**


**Study and Results:** We developed a clustering method (GTMFCM) that combined generative topographic mapping (GTM) and fuzzy c-means algorithm (FCM). It is observed that this method performs better than FCM and Gustafson-Kessel algorithms in terms of values of clustering validity indexes. In business applications, this new method can be used to explore segments of customers to create a complete and vivid profile of customers’ behavioral patterns. Businesses can benefit from such knowledge by aligning their marketing strategies with customers’ preferences.

**What’s New?** Clustering algorithms explore the hidden behavioral patterns of customers. However, the presentation and interpretation of clustering results are difficult for practitioners. Fuzzy clustering techniques are believed to be more capable of revealing information about customers’ behavioral patterns because they assign data to clusters with probabilities. On the other hand, techniques such as GTM visualize the distribution of customers but cannot group them into the desired number of clusters. By combining the two techniques, we created a tool which can do visualization and clustering at the same time with acceptable performance.

**Limitations:** The paper is limited in that the proposed method has been validated using benchmark and simulated data sets but needs further validation using customer data collected from real business situations.
From *JASIST* v. 60 (2)


**Study and Results:** We introduce a novel spam-email detection approach, denoted SpamED, which is designed for solving today’s problem on increasing influx of spam emails that reach user’s inboxes, leading to monetary loss and waste of computational resources. The premise of our investigation is to correctly identify incoming (non)-spam emails based solely on performing *exact* and *partial* similarity matching among the phrases in an incoming email $E$ and the ones in a user-identified spam email $S$, which determines how similar $E$ and $S$ are and subsequently establishes the likelihood of $E$ being (non-)spam. Experimental results compiled by using known spam-detection corpuses on SpamED prove the effectiveness of SpamED with a 96% accuracy in correctly classifying incoming emails.

**What’s New?** SpamED is computational inexpensive, since the word-correlation factors used for establishing the degrees of similarity among emails are (i) pre-computed, (ii) are efficient in detecting (non)-spam emails, (iii) require little user intervention (for labelling incoming spam emails), (iv) minimize the number of misclassified legitimate emails which contain information users cannot afford to lose, (v) allow users the feasibility in expressing and modifying their preference on what constitutes spam and (vi) outperform existing spam-detection approaches in terms of accuracy.

**Limitations:** SpamED is designed for processing text-based emails.