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Enhancing Graduate Education: A Fresh Look at Library Engagement

by Diane Goldenberg-Hart, Communications Coordinator, Coalition for Networked Information[1]

Over 100 librarians, administrators, faculty, and other members of the academic community concerned about issues relating to graduate education convened in Washington DC on October 12, 2007, to participate in the forum "Enhancing Graduate Education: A Fresh Look at Library Engagement."[2] Sponsored by the Association of Research Libraries (ARL) and the Coalition for Networked Information (CNI), the event promoted engagement in conceptualizing the library's evolving role in graduate education, and it encouraged academic libraries to begin considering new ways to partner with the broader graduate studies community. The forum was inspired by the Council of Graduate Schools 2007 report, *Graduate Education: The Backbone of American Competitiveness and Innovation*,[3] which examines the current state of graduate education and how it influences the positioning of the United States in the global economy. Asserting the need for cooperation across education, business, and policy sectors, the report emphasizes the need to strengthen and promote an educational model that will "enhance US innovation and national security in the 21st century."[4] The report's authors emphasized essential cooperation across sectors, enhanced flexibility within institutions of higher education, and focus on interdisciplinarity and globalization, themes that were equally dominant throughout the daylong forum.

The Changing Nature of Graduate Education: Inputs and Outcomes

In her opening remarks, Rutgers University Librarian and ARL President Marianne Gaunt singled out graduate students as "the future of the academy," representing a critical community of library users. As budding teachers and researchers, they are at the nexus of an environment in which traditional standards and practices are being challenged by demographic, technological, economic, and societal forces. Betsy Wilson, Dean of University Libraries at the University of Washington, who introduced the event's keynote speakers, reinforced Gaunt's comments by emphasizing the multiple roles graduate students play, and by identifying them as "the most intense and persistent consumers of library services, collections, and resources." Interdisciplinarity and a global perspective are among the hallmarks of current (and future) graduate classes, underscored by unprecedented technological savvy. This complex combination of broadening perspectives and increasing expectations represent some of the challenges facing the 21st-century research library as it develops strategies to situate itself in an ever-fluctuating academic climate.

With their joint keynote, Suzanne Ortega, Vice Provost and Dean of the Graduate School, the University of Washington, and a member of the Advisory Committee that authored the Council of Graduate Schools report, and Carol Lynch, Senior Scholar in Residence and Director of the Professional Science Master's Initiative, Council of Graduate Schools, set the stage for the day's events by providing an overview of the current state of graduate education and highlighting recommendations from the council's report. Ortega began by asserting that flexibility and agility will be the most important characteristics of the "great 21st-century research university." Academic institutions will need to continuously organize and reorganize themselves around emerging scholarly research topics of significant public interest and concern, and libraries will be called upon to support scholarship in this fluid environment of rapidly

changing and shifting boundaries (between disciplines, degree programs, curricula, etc.). The library's capacity to meet the challenge of continuously changing research priorities and needs will, according to Ortega, support and shape the nature of scholarship through the 21st century.

In plotting a course toward future graduate programs, Ortega suggested considering several guiding assumptions, originally identified by Debra Stewart, President of the Council of Graduate Schools, that influence the quality of graduate education:

- A highly skilled workforce positioned at the frontiers of knowledge creation and professional practice is critical to maintaining healthy economies and a more stable world, as well as American competitiveness and national security.
- The evaluation and improvement of all aspects of graduate program quality is paramount because these programs drive the success of American higher education.
- Interdisciplinary research and education are central to future competitiveness, innovation, and knowledge creation.
- US citizen participation, especially from historically underrepresented groups, must be expanded.
- US graduate programs must attract the best and brightest from around the world, and they must produce globally competent scholars, scientists, and citizens.

The forces identified by Stewart come together to create changes in the way scholarship is organized and produced, how graduate education is delivered, and the way research products (journal articles, dissertations, and, increasingly, capstone projects) are evolving. Various forces are driving these changes, including a knowledge explosion that increases the importance of inquiry-based approaches to pedagogies as well as the increasing importance of synthetic thinking and analysis. A keen global awareness of the importance of research and development to economic competitiveness will also serve to shape graduate study. All of these forces operate in an environment of growing accountability: educators and administrators are continuously called on to explain the value of the work and of the investment in higher education programs.

In addition to providing rich opportunities for academic communities, the forces producing change also introduce numerous challenges. For example, academic institutions will have to work hard to promote environments that foster intellectual risk taking despite short budget cycles and the constant pressure to justify their work. University programs and departments will need to organize in ways that allow research teams to rapidly realign themselves to meet emerging research interests and funding opportunities. Interdisciplinarity will increase, and universities and their scientists and scholars will need to work globally, as well as efficiently and productively across employment sectors. Possible implications for the library, then, lie in the importance of collecting and organizing information "in as granular a manner as possible," to allow for the recombining of knowledge in rapidly accessible ways.

Translational research, which is research that has the capacity to be moved quickly from basic insight to dissemination or application in a broader context, is an example of the kind of product that might emerge from these programs. Professional doctorates (e.g., the Doctor of Education [EdD] and the Doctor of Nursing Practice [DNP]) are other examples, where evidence-based practice is the core competency expected of graduates from these interdisciplinary programs. The kinds of resources required by researchers in these areas, such as gray literature and oral documents, challenge information providers in new ways.

Changes in student demographics and new demands on the labor force are among the influences leading to an increased globalization of graduate education. Carol Lynch outlined some of the challenges of the new graduate environment. An analysis of workforce demographics within the United States reveals that the minority population is doubling while the white workforce is in decline. This trend is particularly notable because members of minority groups are half as likely as their white counterparts to earn graduate degrees. The current generation of "millennial" student poses another kind of challenge: these confident, visual, multitasking learners, who are highly technologically savvy, are a demanding population; it is important to evaluate where their demands are reasonable and valid. Finally, increasing globalization of the talent market places new pressures on US universities. Whereas the United States could once pick and choose among the best international candidates for its degree programs thanks to an oversupply of international applicants, the US today finds itself competing globally for talent. Students now have strong and growing global options, and initiatives like the Bologna process[5] in Europe serve to accelerate the competition.

The globalization of research and graduate education is leading to increasing international partnerships. Many US graduate schools have some form of collaborative degree program with international partners, especially at the master's level. These joint ventures are occurring primarily with European institutions, but some collaboration is occurring with Asian and Middle Eastern institutions as well. Students

in these types of programs will want and need worldwide access to information; in order to better support these programs, Lynch suggests that research librarians might profit from engaging in discussion with their international peers about collaboration and service delivery across international boundaries.

The master's degree is the growth sector in graduate studies in countries including the US, Canada, the UK, and Australia. Various forces are contributing to the increased enhancement of master's programs and increases in the number of master's degrees awarded. To begin with, fewer students are opting for PhDs, and international competition means that the US market share of PhD students globally is declining. Furthermore, job growth is occurring mostly outside academia, reducing the perceived need for doctorate degrees. Also, the changing demographics of the student population, including more women in college, means the issue of family is increasingly important. More people are returning to school, making the "nontraditional" student now the traditional. All of these factors influence the growing popularity of the master's degree for today's student.

One response to these forces has been the proliferation of professional master's degree programs. These programs differ from traditional master's programs in that they offer professional skills-based courses (e.g., marketing, management, statistics, communication skills, etc.) in addition to including advanced courses in the discipline that are normally part of traditional master's (and PhD) programs. Another difference is that an advisory board from the targeted employment sector usually collaborates with the program, helping to shape its mandate and curriculum. These degrees are attractive options that afford professional skills and help address the needs of employers.

It was clear from the ensuing questions and comments that audience members had several core themes in mind. The need to consider the global marketplace was reflected in one participant's concern with how the cost of graduate education is impacting US competitiveness. Another comment dealt with adjunct faculty who are often private sector professionals teaching part-time in the kind of professional master's program described by Ortega and Lynch. How can libraries help to foster the multi-sector partnerships budding within this framework and better serve this disparate population? The professional master's concept provides interesting opportunities for librarians as well: some combination of advanced courses in the targeted discipline, taken alongside researchers and scientists, combined with courses in informatics and communications, for example, could develop into a professional master's specialization.

Herein are opportunities to diversify the library community. Interdisciplinarity, global awareness, agility, fluidity, millennials, and multitasking were some of the key concepts that emerged repeatedly throughout the opening session.

Graduate Student Academic and Research Behaviors: Field Studies Findings

Presentations of three field studies examining the academic and research behaviors of graduate students were next on the program. Neil Rambo, Director of Cyberinfrastructure Initiatives at the University of Washington Libraries, and ARL Visiting Program Officer, served as moderator during the presentation of the findings, which "look at how we are engaging with our graduate students, and, perhaps more importantly, point to how we should be engaging with them." Although the studies were quite different from one another, some of the findings were striking in their similarities.

New York University

Lucinda Covert-Vail, Director of Public Services at the New York University (NYU) Bobst Library, reported on the NYU 21st Century Library Project, "Designing a Research Library of the Future for New York University."[6] The NYU project was born out of a desire to gain a better understanding of faculty and graduate students by closely examining trends in scholarship and the research process in today's university, and how they would affect the research library of the 21st century. Data about graduate students was amassed from focus groups in which library staff sought details on the students' research practices: what they did; how they worked; what they liked; what they considered the library's shortcomings; and what kinds of tools and spaces they needed for their research and for teaching.

NYU organized its findings around several "key dimensions of the graduate student's environment":

- scholars in training;
- spaces and surroundings;
- scholarly community/interdisciplinarity;
- discovery and access; and
- tools for teaching.

One area in which graduate students differed from faculty was in their identity as scholars in training who were just beginning to do research, to write, create, and publish. Perhaps as an extension of this self-perception, with respect to spaces and surroundings, students sought environments that would increase opportunities for community building and closer contact with peers. In essence, they sought a sense of belonging and an intellectually stimulating community of scholars. They

talked about seeing libraries as neutral space, independent of departments. Interdisciplinarity figured prominently in the focus group discussions, and students discussed the complexities and challenges of working across disciplines, seeking to branch out and create new connections. Out of these conversations came the idea of "thought centers," posited as a physical way (as opposed to virtual) to cope with the interdisciplinary nature of their work; thought centers were conceived to be flexible, temporary spaces where speakers and resources from across disciplines could be brought together in one place.

In the dimension of discovery, graduate students revealed themselves to be, predictably, heavily dependent on electronic resources and collections, but not entirely confident in their abilities to use these materials. When they are in an information-gathering mode, they clearly require assistance, but they do not really know where to get it. Interdisciplinarity figures prominently in this realm as well, and students are experimenting with new methods to communicate the nature of their work, such as tagging and tag clouds; they are looking for new ways to share their ideas and to categorize information. Discovery and access represented one of the biggest areas of frustration expressed by students; they are frustrated with what they perceive as barriers to materials like data sets and special collections. There was general dissatisfaction with library tools.

Tools for teaching represented one of the most revealing aspects of the focus groups. They discussed the challenge of teaching, and their bewilderment at doing it for the first time. Most students said that they do not consult with advisors or other faculty members for guidance or advice in teaching, but rather they refer to their undergraduate syllabi, or they search for online resources.

Several strategic implications emerged from NYU's findings, specifically the need to:

- create more spaces and mechanisms for inspiration, possibly to serve as "thought centers";
- enable collaboration and connections within and across disparate disciplines;
- make the discovery, access, and delivery process more efficient and more powerful; and
- expand services beyond traditional conceptions of the library.

University of Minnesota

Cecily Marcus, Library Academic Programs, University of Minnesota, and a Council on Library and Information Resources Postdoctoral Research Fellow, next presented "A Multi-Dimensional Framework for Academic Support," reporting on two studies conducted by the University of Minnesota Libraries.[7] Like the work at NYU, these studies took a broad-range look at what graduate students and faculty were doing throughout the course of their research, initially across 16 departments in the humanities and social sciences. The team later used the methodology from the first study to conduct an analysis of research practices among graduate students and faculty working across disciplines in the sciences. They found many similarities, but also key differences in areas concerning discovery and access, the difficulty in keeping current, the importance of online resources, the complexities of conducting interdisciplinary research, and the role of the library in research.

Researchers at Minnesota found that discovery and access posed a challenge across the entire humanities and social sciences population, especially for the graduate students. They identified areas of particular difficulty as: having too few sources (rather than too many); the physical placement of the library in relation to where they work; and, efficient retrieval of print items (despite a heavy reliance on online tools). As in the NYU study, Minnesota affiliates expressed disenchantment with library tools, not feeling very confident that they were actually discovering everything they needed to find—they wanted a single "master list."

Among students in the sciences, there was a near complete reliance on online resources, a talking point to which students often returned. Their expectation was that everything should be as convenient and efficient as possible. Another issue scientists spoke of (more so than those in the humanities and social sciences) was the difficulty of keeping up-to-date. Faculty claimed to keep up through their graduate students (they described students as knowing what is "cutting edge"), but students themselves worry that they are missing things; also, due to the interdisciplinary nature of their research, they are working in new areas, and in multiple areas, so they are unsure of their ability to find everything they need. In light of these frustrations and concerns, the speaker posed the question, "How do we create resources that are general when starting out in a new area, but that are also reliable?"

With regard to research spaces and communities of scholars, graduate students continue to identify the library as a place to go, but the kind of space is important; the library is still considered an important space despite the reliance on electronic resources. Graduate students find that they do not generally have collaborative spaces of their own; the idea of virtual spaces resulted from these discussions. Many science graduate students, in particular, identified the library as a place to find community, to cross disciplines, and to create new collaborations. The Minnesota study also

revealed that there are significant differences in the way scientists define interdisciplinarity compared to researchers in the humanities or social sciences: humanists and social scientists tended to define the concept as having to do less with the people with whom they were working, and more with the kind of literature on which research is based, as well as with the methods being used. For scientists, interdisciplinarity was defined by the people with whom they were working, each of whom could contribute different levels of expertise from various disciplines. The challenges in both of these interpretations lie in the areas of access, discovery, and spaces, among many other difficulties.

The Minnesota assessments determined that certain core behaviors and activities (discovery, gathering, creating, and sharing) are common to research practices across disciplines, and that there is an urgent need for new online tools, especially in the sciences, although increasingly in the humanities and social sciences. While graduate students are generally perceived as proficient and comfortable with technology, they do not necessarily see themselves as especially knowledgeable about information retrieval and management, nor do they profess to feeling comfortable with the technology. The studies revealed that scientists have more varied repertoires, especially with regard to the types of technology used and the resources available to them, but paper continues to be an important element, especially when it comes to reading and, to a lesser extent, organizing.

University of Washington

Steve Hiller, Director of Assessment & Planning at the University of Washington Libraries, and ARL Visiting Program Officer, rounded out the field studies with his presentation "Understanding the Library Connection to University of Washington Graduate Students in the Biosciences." He reported on the results of the 2006 University of Washington (UW) Libraries Biosciences Review (which included focus groups with graduate students, but was comprised mostly of interviews with faculty), and the 2005 UW Biomedical Research Data Management Study. As part of the 2007 UW Libraries Triennial Survey, researchers used information collected from the earlier studies to develop new questions to further explore some of the issues raised previously, and to determine if they had broader applicability.[8]

Graduate students in the UW focus groups revealed that they identify the library most with the journal (now "e-journal"). Library tools, however, are seen as overly complex and fragmented, so discovery begins primarily outside of library space, with the exception of the popular Web of Science database because it provides an interdisciplinary, or multidisciplinary, approach to information, unlike most other electronic resources. With these students, according to Hiller, "print is dead, really dead"; they want everything to be delivered digitally, or available virtually, and they go to the library as a last resort, unless they do not have dedicated workspace on campus. They also believe that there are too many libraries and that the existing libraries' focus on disciplinary content works against the students' growing concern with interdisciplinarity. Data and reference management also emerged as problematic issues.

Using the library's 2007 triennial survey, library researchers took issues raised by graduate students in the earlier focus groups to see how they compared across graduate student populations in the health sciences, the biological sciences, the physical sciences and engineering, and in the humanities and social sciences. The survey results generally confirmed the findings from the focus groups:

- graduate students rely heavily on journals and digital information;
- discovery takes place increasingly in non-library spaces;
- the physical library is used as a last resort (unless it is needed for work space);
- library search engines and tools are seen as complex and fragmented; and
- data- and information-management services are viewed as very useful.

As a result of these findings, work is underway currently at the University of Washington to enhance discovery and delivery services (e.g., a scan-on-demand pilot project will be launched soon), and to understand better the data-management needs of its constituents.

Following the field study presentations, an audience member asked if "the age of the branch library, the specialized library, is coming to an end." One panelist responded that graduate students have wanted increased centralization for years, and that the push for branch libraries, traditionally, had come from faculty. But now, with increased digital access to materials, this physical need is no longer necessary for faculty either, indicating that, in fact, perhaps branch libraries are becoming a thing of the past. Even so, another panelist reminded the audience, there remains value in specialized physical collections, but libraries must now face the challenge of organizing virtual collections with creative linkages. Furthermore, expertise is a critical service libraries can provide; the issue remains how to get that expertise to user groups in their workspace. Increasing interdisciplinarity also translates into a need for libraries to re-think their traditional organizational approach, which is discipline-focused, as well.

Graduate Student Perspectives: Firsthand Accounts

As a rich complement to the policy talks and assessment reports delivered earlier in the day, conference attendees were treated to a panel made up of three graduate students representing different fields of study. Crit Stuart, Director, Research, Teaching, and Learning, ARL, and a principal forum organizer, introduced Cecily Marcus, University of Minnesota, who served as moderator. The graduate student panelists were: Stephanie Ball, University of Minnesota, environmental health; Mark Nevin, University of Virginia, history; and Allison Robbins, University of Virginia, critical and comparative studies in music.

The panelists spoke about their heavy reliance on library or archival resources (including those outside of their home institutions), and on the expertise provided by librarians or archivists, but their experiences of the library as place, and the role that place played in their work, varied widely. For example, music student Allison Robbins felt a deep connection to her carrel in the Music Library, as both the dedicated work space she used regularly and depended on, as well as a place she felt connected her to a "community" of other graduate students in her field. Despite her relationship with the library, Robbins recounted her research forays for primary source material via Google as her access method of choice. While she indicated that she would consult with a librarian, she clearly conveyed that she would exhaust her own sphere of resources before taking that "last resort" step.

Due to the nature of their research, both Allison Robbins and Mark Nevin, the history student, rely heavily on primary source materials. Interestingly, their comments on and experiences with the library as place were quite different. Robbins spoke of spending countless hours in the University of Virginia libraries, and of depending greatly upon the library, as both work and social space, but also for equipment needs (e.g. viewing videotapes), and for teaching resources. One difficulty she highlighted was how dispersed her materials are: the interdisciplinary nature of her research means that she draws from various subject areas, including music, film, dance, and others, so she spends a considerable amount of time traveling between various collections, housed in different buildings, and spread out all over campus.

On the other hand, Nevin, the history student, told the audience that he rarely sets foot into any of his institution's libraries, citing distance and other difficulties as deterrents. For him, remote access to tools and services provided by his institution have been indispensable, but the sources he would need for his dissertation were usually located at other institutions, as part of archives and/or special collections in other cities and states. Access to these resources presented other challenges generally applicable to graduate researchers in history.

As a student in the health and environmental sciences, Stephanie Ball relies very heavily on the most current literature available. An avid library user, she, like Nevin, seldom makes use of the physical space of the library, but she is a dedicated user of its online resources. She agreed that the thought of having library space as a dedicated work space was appealing, but she cited numerous concerns, among them security of her equipment should she need to leave her work space, as reasons why she does not currently make use of the space in this manner. One of Ball's biggest challenges is organization, and this is one area in which she feels she could use some help, for example, in the availability of new types of information management tools.

These testimonials echoed many of the themes reported earlier. All three students acknowledged the value and importance of library resources, but each with obvious, and sometimes subtle, distinctions in the way they see the library and make use of its resources for their research. Discovery and access figured prominently as commonly shared activities, but the stories these students shared conveyed their frustrations and struggles with, first, trying to identify materials, and then, with gaining access to the physical items. Their diverging perspectives on library space, and as a place, were also revealing of possible differences across disciplines.

Getting to Work: Afternoon Breakout Sessions

The afternoon consisted of concurrent breakout sessions that allowed participants to more deeply explore the findings of the field studies and to imagine implications for enhancing library space, services, and resources for graduate students. Conference attendees were invited to join one of three tracks, where they could work with facilitators to share problems and solutions from their own institutions, experiences, and observations, and then brainstorm with other participants for additional solutions or ideas. The session topics were Spaces & Communities of Scholars, Discovery & Access, and Interdisciplinarity.

Joan Lippincott, CNI Associate Executive Director, provided a summary of the three breakout session results, as well as concluding remarks. She began by reprising several key challenges that had been identified in the opening plenary session. Today's graduate students must learn to work with agility and at the frontiers of knowledge creation, they need to function as intellectual innovators, and they must act as synthetic thinkers. Lippincott urged participants to keep these

overarching themes in mind when considering the results of the afternoon sessions, and to push themselves to think more broadly and creatively while imagining strategies to support the new generation of scholars, faculty, and professionals.

Spaces & Communities of Scholars

Participants in the Spaces & Communities session began by delineating some strategies known to be successful, including flexibility in spatial configurations (both current and future), library presence in other spaces (such as librarians holding office hours in buildings outside the library), virtual spaces for students not on campus, and librarian or service staff availability 24–7. Exclusive space for graduate students was another, particularly popular, idea.

The group also explored the question of how to turn pleasant spaces into intellectually stimulating communities. Some proposals here included multi-media labs, displays of special collections materials or artwork, and the creation of collaborative and social spaces. An idea that recurred throughout the conference, and which was further explored by this group, was that of sharing work-in-process, in which students might create visual presentations about their projects, or, more traditionally, gather in groups to discuss ongoing work.

Discovery & Access

For the group considering Discovery & Access issues, a driving principle was the desire to have targeted and engaging services be part of the user workflow, a concept borrowed from Lorcan Dempsey of OCLC. This group's ideas included community-oriented services, such as recommender systems created by students in a particular program. Working with content providers (such as Google and others) to make academic content more readily available was another suggestion. Some of this group's specific ideas included:

- remotely accessible technology platforms, such as wikis and blogs, for students in the field, in other countries, etc.;
- systems that could combine controlled vocabulary with user tags; and
- incorporating guides into course management systems.

Special collections were identified as an area needing more visibility and attention; participants in the Discovery & Access session suggested that having graduate students organize collections and create access portals to them would be one way of engaging students in the issues presented by these materials. It was generally accepted, also, that more workshops for graduate students on the identification and use of archives and special collections are needed.

Some of the issues this group explored included thinking of ways to build partnerships with departments, and how to establish ongoing relationships with members of a target group. It was suggested that a re-conceptualization of the areas of expertise among library staff was necessary; possible new roles in the library could include copyright managers, Unix specialists, digital librarians, and subject specialists who focus on supporting users and building relationships rather than building collections.

Interdisciplinarity

The group focusing on Interdisciplinarity first identified key issues that institutions must consider with respect to this growing trend: the library funding model has been, historically, tied to traditional departments; and, graduate students are not involved in collection decisions, including cuts of serials. Another critical issue considered by this group was that discipline-specific terminology is an impediment to students when they wish to identify key sources in other disciplines. To address some of these challenges, the group proposed several potential service models; among them:

- assigning a graduate library advisor to each student;
- finding new ways to insert the library/librarian into the academic process;
- providing outreach to centers and institutes, in addition to departments; and
- conducting focus groups solely with graduate students.

In closing, Lippincott emphasized that the library's role is more than "discovery and access; we need to add *production* to the suite of services, and to our conceptual model of what the library is about," to help support the new, iterative process in which our users work. Students need environments in which they can discover and access materials in a variety of formats, but they also need the tools, software, and equipment to create something new and staff expertise to use the resources effectively. They also need new spaces, such as presentation rooms, to practice making oral presentations employing products they create. Digital exhibit space, both physical and virtual will give users ideas about what can be done with the library's content, services, and facilities. In response to an audience question concerning student interest in organizational/information management tools, Zotero (http://www.zotero.org/) was mentioned as a promising resource. This Firefox extension, developed by the Center for History and New Media at George Mason University, enables users to collect, manage, and cite research sources from the Web browser itself.

Finally, the library must also work to target outreach to graduate students, faculty, and graduate student leadership. As demonstrated by forum speakers, rich assessment techniques can be of tremendous value to those institutions that have adopted them, and they can be invaluable resources for understanding user needs and perceptions and determining effective strategies for delivering meaningful services in the ever-changing and evolving environment of graduate studies.

[1] The author gratefully acknowledges the significant contributions of Jaia Barrett, Joan Lippincott, Clifford Lynch, and Crit Stuart to this report.

[2] PowerPoint presentations from the forum "Enhancing Graduate Education" are available online at http://www.arl.org/events/fallforum/forum07/.

[3] *Graduate Education: The Backbone of American Competitiveness and Innovation* (Washington DC: Council of Graduate Schools, 2007), http://www.cgsnet.org/Default.aspx?tabid=240&newsid440=47&mid=440.

[4] *Graduate Education*, p. 5.

[5] "The Bologna Process aims to create a European Higher Education Area by 2010, in which students can choose from a wide and transparent range of high quality courses and benefit from smooth recognition procedures. The Bologna Declaration of June 1999 has put in motion a series of reforms needed to make European Higher Education more compatible and comparable, more competitive and more attractive for Europeans and for students and scholars from other continents. Reform was needed then and reform is still needed today if Europe is to match the performance of the best performing systems in the world, notably the United States and Asia." Excerpt from, "The Bologna Process: Towards the European Higher Education Area," http://ec.europa.eu/education/policies/educ/bologna/bologna_en.html, last updated August 13, 2007.

[6] Cecily Marcus, Lucinda Covert-Vail, and Carol A. Mandel, "NYU 21st Century Library Project: Designing a Research Library of the Future for New York University: Report of a Study of Faculty and Graduate Student Needs for Research and Teaching," January 2007, http://www.library.nyu.edu/about/KPLReport.pdf.

[7] More information about both studies is available online at http://www.lib.umn.edu/about/mellon/ and at http://www.lib.umn.edu/about/scieval/.

[8] Details about these projects are available online: 2006 UW Libraries Biosciences Review, http://www.arl.org/arldocs/resources/pubs/mmproceedings/150/wilson_files/wilson.ppt; 2007 UW Libraries Triennial Survey, http://www.lib.washington.edu/assessment/surveys/survey2007/; 2005 UW Biomedical Research Data Management Study, http://www.jamia.org/cgi/content/abstract/14/4/478.

NEW SPARC CAMPAIGN ENGAGES STUDENTS ON OPEN ACCESS

by Jennifer McLennan, Director of Communications, SPARC

Over the past year and a half, SPARC has had the opportunity to begin working with students. Regardless of their discipline, level of study, or institution size, students across North America have made clear their commitment to all things open. While our conversation with students started with public access to publicly funded research, it has evolved and grown in many directions—culminating most recently with the launch of an educational campaign centered on open access.

The student dedication to "open" was first made clear to us when Students for Free Culture at New York University designated their annual regional meeting to open access, and invited SPARC, Public Library of Science, and Science Commons to speak. The messages from the speakers were familiar, but the excitement and engagement of the audience—and the views they had to offer—were completely new. We expected the meeting to be an introduction to open access for students, instead it turned into a learning experience for us on the depth of the student commitment to making open sharing of information habitual—for everyone.

The potential that students clearly embody for shaping the future of scholarly exchange and the growing level of student activity throughout 2007—as well as the hire of the first SPARC summer intern—inspired the genesis of the SPARC student campaign and companion guide: *The Right to Research: The Student Guide to Opening Access to Scholarship*. Developed in close collaboration with our student colleagues, the guide is a tool they will use to engage more of their peers.

Specifically, *The Right to Research*:

- helps students recognize the problem of access, saying they shouldn't have to skip over research that could be important to their papers;
- introduces the principle of open access (OA), making a clear distinction between the principle and the ways OA is being realized—through OA journals, repositories, and copyright management;
- indicates how open access can make life as a student easier, advance research, widen access to those who need it, and increase visibility for student scholars;
- offers ways to support OA that pertain both to graduate students approaching publishing decisions and to undergraduates who want to take up the OA banner.

Please join us in inviting more students to the conversation on access. Visit the SPARC students Web site at http://www.arl.org/sparc/students/.

Statistics & Measurement

Martha Kyrillidou, Director, Statistics & Service Quality Programs

Reshaping ARL Statistics to Capture the New Environment

The *ARL Statistics 2005–06* describe a familiar picture for research libraries in North America. The rising cost of serials is outpacing general inflation, the cost of monographs is hovering close to inflation, and salaries are increasing moderately more quickly than inflation.[1] The numbers of reference and circulation transactions have fallen from their levels of 10 years ago,[2] but more users participated in instructional services offered by the library.[3] Librarians are becoming more involved in the instructional process and are increasingly an integral part of the teaching and learning infrastructure at their institutions.

Historically, the perceived strength of a research library has been manifested in the size of its research collection—number of volumes held, volumes added, and serial subscriptions have been key indicators of quality as well as quantity in the eyes of some stakeholders. In a world where the basic unit of research information was the printed scholarly monograph or the printed scholarly journal, it was a plausible notion that the more you have of these things the better equipped you may be in supporting high-quality research. One could argue that this is still the case. However, with the introduction of digital information and the dramatic changes in the nature of content, measuring the size of library collections cannot be what it used to be.

> *...measuring the size of library collections cannot be what it used to be.*

For example, in 2005–06, ARL libraries spent 43% of their materials budget on electronic resources—a total of $431 million out of $1.1 billion. This measure indicates the quantity and complexity that libraries are dealing with, but ultimately these figures cannot offer much when it comes to describing the quality of research, teaching, and learning at an institution. We need new measures to do this. ARL is beginning to address this need with important changes and additions to the ARL Statistics.

From Serial Subscriptions to Serial Titles

The unit cost of a serial subscription that ARL has tracked becomes relatively uninformative in a world where research libraries are increasingly offering access to the same serial title via multiple subscriptions and interfaces. The impact of electronic publishing on research library investment in serials was one of the forces behind a recommendation to move away from tracking serial subscriptions and towards tracking serial titles.[4] The *ARL Statistics 2005–06* is the last time ARL will publish a unit cost for serial subscriptions.

The ARL Statistics and Assessment Committee determined that a new way of counting serials based on titles rather than subscriptions would better reflect the true scope of the serial content provided by research libraries and recommended that ARL transform the serial counts from subscriptions into titles. With the revised definitions for survey year 2006–07, ARL libraries are now asked to report unduplicated counts of serial titles. Dual-format titles will be reported as electronic-only in the *ARL Statistics 2006–07*, reflecting the current transition from print to electronic formats.[5]

The process of deriving serials title counts was tested over the period of a year and, although not perfect, it is feasible and practical in the short-term and much more meaningful in the long-term. ARL reported extensively on the testing done at Texas A&M University and a detailed process for implementation is documented in the ARL Statistics Webcast, which is available on the ARL Web site.[6] Issues have emerged related to ISSN standardization practices, serials with no ISSN assignments, branch and department libraries that are independent from one another and hard to deduplicate, and difficulties regarding the implementation of new procedures. Collaborative discussion on how to address such issues is taking place through postings on the Library Assessment Blog[7] and during in-person conversations at ARL Survey Coordinators workshops and meetings. ARL also provides an ARL Statistics FAQ online to help member libraries move into the new paradigm of counting serials.[8]

From Collections to Expenditures

In an environment where collections are morphing into terabytes, petabytes, exabytes, zettabytes, and yottabytes of information, it is questionable whether the units of volumes held, volumes added, and serial subscriptions can continue to offer the utility they had in the past. The challenge of measuring collections in new ways gave rise to the work of the ARL Task Force on New Ways of Measuring Collections.[9] During its two-year investigation (see chronology sidebar), the task force systematically collected qualitative feedback through one-on-one interviews with each ARL library director and, during the second year of its operation, the task force deployed two top researchers in qualitative and quantitative methodologies, Yvonna Lincoln and Bruce Thompson. Two reports were produced for the ARL community: "Research Libraries as Knowledge Producers: A Shifting Context for Policy and Funding,"[10] documenting the results of the qualitative inquiry, and "Some Alternative Quantitative Library Activity Descriptions/Statistics that Supplement the ARL

CHRONOLOGY OF NEW WAYS OF MEASURING COLLECTIONS

December 2004
ARL established Task Force on New Ways of Measuring Collections, charged with articulating issues associated with the ARL Statistics and proposing changes to how ARL measures research library collections.

May 2005
Preliminary report on task force's work presented at ARL Business Meeting. Report based, in part, on interviews of 100 ARL library directors conducted by members of the task force chaired by Brinley Franklin (University of Connecticut).

October 2005
During ARL Membership Meeting, task force forwarded recommendations to ARL Board of Directors, who approved the following actions:

1. Revisit the foundations of the ARL statistics collected for membership purposes to determine if there are new ways of describing research library collections.
2. Simultaneously, develop a profile of the characteristics of a contemporary research library that could serve to complement other measures of library collections.
3. Then, determine/develop new meaningful measures to augment current ones to support the profile of a research library.

February 2006
ARL engaged Bruce Thompson and Yvonna Lincoln of Texas A&M University to conduct research projects to carry out recommendations 1 and 2, respectively.

October 2006
Thompson and Lincoln reported their research findings at ARL Membership Meeting.

February 2007
Board, task force, and Statistics and Assessment Committee chaired by Colleen Cook (Texas A&M) adopted Action Agenda for New Ways of Measuring Collections.

May 2007
Statistics and Assessment Committee proposed: calculating Expenditures-Focused Index for past three years and making it publicly available, changing serials definitions from subscriptions to titles, eliminating limited use questions and modifying ARL Supplementary Statistics, and initiating qualitative data gathering to develop profiles of member libraries.

October 2007
ARL published past three years of Expenditures-Focused Index (see http://www.arl.org/stats/index/).

October–December 2007
ARL offered training to explain changes in ARL Statistics instructions. ARL invited each Statistics and Assessment Committee member to submit a qualitative description of their library for review in spring 2008.

Logarithmic Index,"[11] documenting the results of the quantitative inquiry. Based on these reports, the task force forwarded a set of recommendations to the ARL Board of Directors that formed the following action agenda for the ARL Statistics and Assessment Committee during 2007:

1. Reserve use of the current Membership Criteria Index for those occasions when it is needed for consideration of membership issues.
2. Implement an Expenditures-Focused Index.
3. Use the new Expenditures-Focused Index for any public reports, such as in the *Chronicle of Higher Education*.
4. Begin to develop a Services-Based Index that combines the following three factors: collections, services, and collaborative relationships.
5. Revise definitions for collections-related data categories currently collected and experiment with a variety of new measures, including usage data, strength of collections, and service quality measures to develop a richer set of variables for potential inclusion in the three-factor Services-Based Index (see above).
6. Collect qualitative data to develop a profile of ARL member libraries.

The issue of fluctuating rankings in the ARL Membership Criteria Index previously published in the *Chronicle of Higher Education* gave rise to the systematic investigation of the nature of the five variables included in this Index: volumes held, volumes added (gross), serial subscriptions, total expenditures, and professional staff plus support staff. Through the quantitative analysis performed on the existing variables, alternative approaches were proposed. The first implementation was the development of an ARL Expenditures-Focused Index composed of four variables: total expenditures, expenditures for library materials, expenditures for professional salaries, and total professional staff plus support staff. For the first time this year, the *Chronicle of Higher Education* published the new ARL Expenditures-Focused Index.

The Expenditures-Focused Index calculates principal component scores and the analysis is based on all university member libraries' data (as compared with the Membership Criteria Index, which is based on the 34 founding members of the Association). The Expenditures-Focused Index is a summary measure of relative size of the investment made by ARL university members' parent institutions in their libraries. It has been calculated retrospectively beginning with data from 2002–03.[12]

Although similar to the ARL Membership Criteria Index in reflecting the investments made in research libraries, the ARL Expenditures-Focused Index is less affected by the rapidly changing context of library collections.

Developing New Indicators

The new Expenditures-Focused Index is only the first step in reshaping ARL statistics. ARL's historical descriptive statistics are being re-examined and adjusted to reflect the changing context of collection access and ownership.

The ARL Statistics and Assessment Committee is currently engaged in developing new quantitative and qualitative indicators and indices to describe research library collections and services and their contribution to research, teaching, and learning. In particular, the notion of a three-factor index describing collections, services, and collaborative relations is a viable proposed construct as tested with the existing variables. Yet more work is needed to develop robust variables that withstand the passing of time and allow us to describe the nature of libraries into the future. For example, collaborative relations currently are being measured with two variables: interlibrary borrowing and lending. Other new ways of sharing information like consortial purchasing, collaborative remote storage, and collaborative purchasing have emerged. We have a challenge in how we measure such concepts.

Key aspects of collaborative relations may be described only in qualitative terms in the future. For example, in the recently published commemorative volume of ARL's 75th anniversary, *Celebrating Research*, the editors include library overviews and profiles for the rare and special collections available for use in research libraries.[13] The ARL Statistics and Assessment Committee members are moving forward with the challenge of constructing profiles for entire research libraries and rendering them as succinct descriptions that will be analyzed to determine the elements of standardized ways for measuring research libraries in both qualitative and quantitative terms.

The complexity of research libraries in the digital future is hard for us to capture in the beginning of the 21st century. We seek to define new ways for describing research libraries that will have the enduring value that has historically characterized the ARL Statistics.

For more information about the ARL Statistics or to download the data files or a PDF of the publication, visit http://www.arl.org/stats/arlstat/. To order print copies of the publication, send e-mail to ARL Publications pubs@arl.org.

[1] From 1985–86 through 2005–06, selected annual average percent increases were as follows: 7.5% annual rise in expenditures on serials, 5.3% annual rise in unit cost of serials, 3.1% annual rise in monograph expenditures, and 2.9% annual rise in unit cost of monographs. Over the same period, salary expenditures rose 4.5% annually and the Consumer Price Index rose 3.1% annually.

[2] The median number of reference transactions in 2005–06 was 67,697, as opposed to 155,336 in 1995–96, based on data received from 79 libraries. The median number of circulation transactions in 2005–06 was 466,403, as opposed to 560,244 in 1995–96, based on data received from 80 libraries.

[3] The median number of presentations in an ARL library was 833 and 13,051 participants in 2005–06, as opposed to 719 presentations and 8,410 participants in 1995–96. These figures are based on 84 libraries reporting the number of presentations and 82 libraries reporting the number of participants in those presentations.

[4] Martha Kyrillidou, "The Impact of Electronic Publishing in Tracking Research Library Investments in Serials," *ARL: A Bimonthly Report*, no. 249 (December 2006): 6–7, http://www.arl.org/bm~doc/arlbr249serials.pdf.

[5] Richard K. Johnson and Judy Luther, "The E-Only Tipping Point for Journals" (Washington DC: ARL, 2007), http://www.arl.org/bm~doc/Electronic_Transition.pdf; Karla Hahn, "The State of the Large Publisher Bundle: Findings from an ARL Member Survey," *ARL: A Bimonthly Report*, no. 245 (April 2006): 1–6, http://www.arl.org/bm~doc/arlbr245bundle.pdf.

[6] ARL Statistics Webcast, http://www.arl.org/arldocs/stats/statsevents/stats_webcast/120407ARL_final.html.

[7] Library Assessment Blog, http://libraryassessment.info/?cat=28.

[8] ARL Statistics FAQ, http://www.arl.org/bm~doc/statsfaq_dec3.pdf.

[9] Task Force on New Ways of Measuring Collections, http://www.arl.org/stats/aboutstats/tfnewways.shtml.

[10] Yvonna Lincoln, "Research Libraries as Knowledge Producers: A Shifting Context for Policy and Funding" (Washington DC: ARL, 2006), http://www.arl.org/bm~doc/lincoln.pdf.

[11] Bruce Thompson, "Some Alternative Quantitative Library Activity Descriptions/Statistics that Supplement the ARL Logarithmic Index" (Washington DC: ARL, 2006), http://www.arl.org/bm~doc/bruce_3mk.pdf.

[12] ARL Index, http://www.arl.org/stats/index/.

[13] Philip N. Cronenwett, Kevin Osborn, Samuel A. Streit, eds., *Celebrating Research: Rare and Special Collections from the Membership of the Association of Research Libraries* (Washington DC: ARL, 2007), http://www.celebratingresearch.org/.

The E-only Tipping Point for Journals

In December 2007, ARL published "The E-only Tipping Point for Journals: What's Ahead in the Print-to-Electronic Transition Zone," by Richard K. Johnson and Judy Luther. ARL commissioned the report to examine the issues associated with the migration from dual-format publishing toward e-only publication of journals.

The authors analyze librarian and publisher perspectives on format migration, considering drivers toward e-only publishing and barriers to change.

The report is available for free download from the ARL Web site at http://www.arl.org/bm~doc/Electronic_Transition.pdf.

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ARL Calendar 2008

http://www.arl.org/events/calendar/

February 7–8	**ARL Board Meeting** *Washington DC*
February 19–20	Planning for Results: Making Data Work for You *Washington DC*
March 10–14	Service Quality Evaluation Academy *New Orleans, Louisiana*
April 7–8	CNI Spring Task Force Meeting *Minneapolis, Minnesota*
April 10	The Art of Strategic Persuasion *Washington DC*
May 20–23	**ARL Board & Membership Meeting** *Coral Gables, Florida*
July 28–29	**ARL Board Meeting** *Washington DC*
August 4–6	Library Assessment Conference *Seattle, Washington*
October 1–4	National Diversity in Libraries Conference *Louisville, Kentucky*
October 14–17 ***Tentative dates***	**ARL Board & Membership Meeting** *Washington DC*
November 17–18	SPARC Institutional Repositories Meeting *Baltimore, Maryland*
December 8–9	CNI Fall Task Force Meeting *Washington DC*

ARL Membership Meetings 2009

May 19–22, 2009, Houston, Texas

October 13–16, 2009, Washington DC
Tentative dates