Environmental Scan 2013

By the ACRL Research Planning and Review Committee

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significant challenges and difficulties with recruitment, retention, and revenue generation if they do not adapt and change. Academic librarians will need to find ways to assist their institutions with student recruitment and retention, as well as adapt their instruction and service models for more underprepared students entering the academy.

Implications

- Academic librarians and libraries will need to engage and redirect their research agendas towards assisting their institution in the recruitment and retention of students.
- Higher education will be challenged with more underprepared students entering the academy, and librarians need to be prepared to offer innovative services to help these students succeed.

The Rise of MOOCs

The cost of a college education continues to outpace inflation. As a result, institutions are under fire to find away to deliver a high-

- With the emerging "Alt" professions, the challenge will be to understand the relationship between what librarians offer and what new support is being offered by colleagues and support units on campus. Are there opportunities for the library to offer new forms of support for scholars, and/or is this a time to review existing services, which might be better placed elsewhere on campus?

The Future of the Profession

"Our jobs are shifting from doing what we've always done very well, to always being on the outlook for new opportunities to serve an unmet need which will advance teaching, learning, service and research," says Brian Mathews (2012a, 2). To be prepared for the future and be ready for new opportunities, many librarians and information professionals will revision their roles and define new opportunities. Anticipating and preparing for new roles and how these roles can expand and evolve over time will be key to an enduring, engaged, and thriving profession in the future.

Internal Disruption Needed

To meet the challenge to transform and reinvent our profession, librarians should start thinking of their organizations as a startup venture, says Mathews. Fostering entrepreneurs from among the ranks, finding better ways to reward innovation, supporting creativity and building on (rather than shrinking from) failure are all part of that mindset. This rapid prototyping approach also "fails smarter" or builds failure into the process and tests and attempts many projects, not just the few perfectly developed ones (Mathews 2012a). This requires examining any assumptions about the existing infrastructure or the present service paradigm and looking for ways to do what librarians do well, but in new domains or environments, even environments that will continue to change radically. Embracing a startup mentality frees the profession to think beyond the existing service model for libraries, without the restraints of tradition, in order to "build something that doesn't exist and to create something that wasn't there before that is now absolutely essential" (Mathews 2012a, 11).

Mathews also points to the profession's need to rethink assessment, which has been tied to incremental improvements in library operations. Assessment has tended to support continuous innovation that focuses on what is sustainable, rather than searching out what is new and revolutionary. Continuous innovation is traditional, predictable, and contrary to the disruptive concept of discontinuous innovation:

> Continuous innovation is incremental and takes place within existing infrastructures. It builds on existing knowledge and existing services without challenging underlying strategies or assumptions.
>
> Discontinuous innovation brings forth new knowledge and new conditions that result in development of new products, services, or operating models (Miller and Morris 1998, 4–7, as quoted in Mathews 2012b, 3).

Discontinuous innovation is "not about making our services incrementally better, but developing completely new services and service models" (Mathews, 2012a, 8). Assessment

> finding and citing data sets; or providing web guides and finding aids for data or data sets), as well as technical services (e.g., providing technical support for data repositories, preparing data sets for a repository, deaccessioning or deselecting data sets from a repository, or creating metadata for data sets) (Tenopir, Birch, and Allard 2012, 7)

The survey indicates that, despite the demand, "only a small minority of academic libraries" (Tenopir, Birch, and Allard 2012, 3) offer their constituents RDS, though some of the libraries reported having plans to introduce RDS in the future. Offering RDS would make the academic library a visible and vital partner in the research process on campus, expand the role of the library in the academic pursuits of the faculty and students, and offer vital support for the institution's knowledge creation process and grant funding interests.

> This situation presents a unique opportunity for academic libraries to play an even more active role in the research process in several ways. First, academic libraries can provide consulting services related to research data management and curation. Second, academic libraries can provide the infrastructure, or at least the front end, for data storage and curation. Third, academic libraries can support librarians becoming active members on research and grant proposal teams as data curation consultants (Tenopir, Birch, and Allard 2012, 41)

Implementing RDS gives academic libraries the chance to expand their role and, at the same time, support the future of the profession by helping librarians assume new roles in creating, curating, and managing data. The survey indicates that of the minority of libraries that have staff involved in offering RDS, most have "reassigned or plan to reassign existing staff" (Tenopir, Birch, and Allard 2012, 29) and a few are providing training opportunities to develop the skill sets that would be required for these new assignments. Reassigning and retraining existing staff for RDS will meet a present and future need in the research process, enhance the profile of the library on campus, and create or redefine opportunities for future librarians.

The ARL 2030 Scenarios describe four possible futures for the research landscape and explore the dynamics and interaction of "many critical uncertainties" in these scenarios and how they might play out over the next 20 years. The four scenarios presented together "tell widely divergent stories which explore a broad range of possible developments over time" (ARL Stratus, Inc. 2010, 8); however, all four scenarios presented, save one, describe futures that are supported by the creation, management, and sharing of new data, the management of data repositories, and the use of data visualization tools. Though there are maj(e)4(w((h)-4(e2w 1nTc 0 TwE

- Academic library administration should gauge the demand for research data services on their campuses and initiate programs offering these services to their communities.
- Academic library administration should consider the reallocation of resources and reorganization of staff in order to initiate research data services on their campuses.
- Academic library administration should promote professional development opportunities that encourage the development of data curation and data mining skills.

Creating Content

Some specific indicators about the future of the profession suggest that librarians will also be called on to take a greater role in producing all types of content: publications, applications, and intellectual output. Librarians already have a foothold in some areas of content creation: digitizing and organizing the 2(de8-0.004 T0ur)3(a)4(l)-2((l)-2)-2(c)4(l)-2()17(i)-6-10(a f)]a,j -3o ler/M

social networking site use at several Israeli universities and colleges disclosed that Facebook and Twitter activity may be useful in the information assimilation stage, but the authors are careful to note that this process has not yet been fully integrated into the faculty research process (Forkosh-Baruch and Hershkovitz 2012). A study of engineering faculty emphasized the long-understood importance of immediate, online access to current and archived scholarship (Engel, Robbins, and Kulp 2011). Convenience and ready access remain important factors in scholarly uptake and use of materials (Tenopir, Volentine, and King 2012). Demands on faculty time plus perceptions of information overload combine to create researcher demand for information tools that are adequate but not necessarily ideal by librarian standards (Kroll and Forsman 2010). A multi-year study conducted by Connaway, Dickey, and Radford (2011) showed that convenience in access is critical and frequently the primary factor in determining the utility of available materials and resources. Some researchers have theorized that expanded access to information through electronic collections and discovery tools has resulted in papers that cite more topically relevant material, reference older material that is now available online, and link to articles from less well-known authors (Wu, Huang, and Chen 2012). This research appears to support previous conclusions that wider access to more online materials has resulted in more superficial reading (Ollé and Borrego 2010). Although abundant digital resources and ready access to online scholarship4(ondu)Bm0(r)3(4(r)3(i)-2(s7.57ar)-1(s)-5(h)-4(i)-6(p4(ondu),.e)-4(ha)4(s)o(s7.574454(a)r)

prestige for their work, promotion and tenure are inexplicably intertwined with the notion of publishing in established, “brand name” journal titles (Nosek and Bar-Ilan 2012). Those identities are then used by scholars as a gauge of importance, impact, and topical information published within the title (Nosek and Bar-Ilan 2012). Switching to OA titles, which may not have accumulated the stature associated with older, more established titles, will be a hurdle for scholars to overcome when deciding where to publish, particularly for those in the initial stage of their career. Communicating the lack of scholarly risk associated with publishing in OA journals may provide opportunities for librarian-research collaboration. OA is compatible with peer review and relies on the peer-review process to disseminate material of scholarly excellence. The process of peer review is not dependent on the method of publication; it is a result of the rigor and integrity of the

eLife, a new open-access journal in life sciences and biomedicine, is an initiative designed to rapidly disseminate research results and support digital publications. A joint project of public and private research funders, eLife's "primary motivation is to serve the interests of science" by recognizing that "communicating research results is as important as the experiments themselves." More than just a publishing venture, eLife seeks to influence the communication of scholarly information in the following areas: provide a more efficient publishing model; encourage and use digital media formats for broad dissemination of information; offer options that encourage OA; and

- Library vendors will expand and develop techniques for device pairing, which will allow researchers to use smartphones, tablets, and other devices to easily connect to information databases while away from their campus networks.
- Discovery environments will adapt to changing methods of formal and informal scholarly communication methods and developing technologies. These new discovery interfaces will require collaboration among scholars, librarians, and technical experts to visualize, communicate, and distribute information.
- Techniques, methodologies, software development, and educated library staff will be in demand to help institutions preserve digital scholarship.

Radical Collaboration

Librarians have long recognized the need to develop new and creative strategies for library collaboration. In 2008, a series of essays entitled No Brief Candle that championed increased collaboration and risk taking was issued by the Council on Library and Information Resources (CLIR 2008). In 2009, a peer-reviewed, open-access journal, Collaborative Librarianship, was born with a clearly defined mission to extol and build on library collaboration, to essentially embrace the challenges of the future with innovation (Gaetz 2009). The enormous challenge facing academic libraries is breaking through rigid traditions as "libraries tend to be risk-averse organizations; to remain relevant they must be willing to experiment and innovate" (CLIR 2008, 9).

The challenge to rethink and retool traditional methods of collaboration is resonating in academic libraries. This bold charge has come to be known as radical collaboration, and it challenges libraries to go beyond standard library collaborative initiatives; to experiment and be daring. James Neal at Columbia University has been the most outspoken advocate of radical collaboration. In a series of presentations and webcasts, Neal notes key problems and issues that include wasteful library operations, outmoded collection endeavors, and shifting user behaviors (Neal 2010a, 2011a, 2011c). Neal observes that academic libraries must overcome several complicated hurdles as they face heightened accountability and assessment from government and university administrators (Neal 2011b). Neal believes that the only viable path for libraries to succeed is through radical collaboration. "The two things we must advance are primal innovation, a basic commitment to risk and experimentation, and radical collaboration, deep and unprecedented partnerships. Renovation is grossly inadequate. Deconstruction is totally essential" (Neal 2010, 1).

Another leader in the call for pushing the envelope of traditional library collaboration is Anne Kenney, university librarian at Cornell University. The libraries at Cornell University and Columbia University are undertaking a collaborative venture called "2CUL" (a combining of the two universities' acronyms) initially funded by a Mellon Foundation grant with Neal and Kenney as spokespersons. As far back as 2009, Kenney made several "bold assertions" that highlighted her view on redundant operations and collections in academic libraries. Her views parallel Neal's on radical collaboration as she points out incentives and barriers for collaboration, libraries, and areas that are most appropriate to launch radical collaborative efforts. Kinney says that "collective collections" (collaborative collection building) and "backroom functions" (sharing technical services workflows) are areas ripe for radical collaboration (Kenney 2009).

Beyond Neals and Kenney's inspired body of work on radical collaboration, the term has now come to be applied to any collaboration that advances beyond mainstream and traditional efforts (Butler 2012; OCLC and Library Journal 2012). Endeavors for radical collaboration in academic libraries can be sorted into three main areas of activities: (1) merging technical services; (2) collection building and resource sharing; and (3) continual growth of large regional print repositories.

Radical Collaboration of Technical Services

Much of the ongoing radical collaboration focuses on merging technical services operations, but actualized results of these collaborations are modest to date. Large library consortia, such as Orbis Cascade (Orbis Cascade

Implications

- Academic libraries will expand digitization and sharing of collections using third-party vendors, such as HathiTrust and Internet Archive.
- Patron-driven acquisitions plans, particularly for e-books, will continue as partner libraries and library consortia continue to share costs and access to resources.
- Rapid ILL and other fast, unmediated ILL initiatives will become increasingly mainstream as libraries and library consortia look for ways to reduce book purchasing, while at the same time expanding access to resources

Radical Collaboration in Large Regional Print Repositories

Growing collaboration to build and archive print holdings across state and regional levels is observed, many being conducted by library consortia. The Center for Research Libraries lists several wide-scale print journal consolidation projects launched by the Five Colleges, the Orbis Cascade Alliance, the Pennsylvania Academic Library Consortium, the Triangle Research Libraries Network, and the Greater Western Library Alliance (CRL 2012). The Maine Shared Collections Strategy (MSCS) project has brought eight of the state's largest libraries and state library consortia together to create strategies on consolidating and sharing print collections that will includes books as well as journals (MSCS 2011).

With these and many more journal consolidation projects ongoing or in early planning stages, a report issued by Ithaka S+R was published to assist libraries in determining what print journals can be withdrawn responsibly. The report discusses such issues as minimum time period retention, number of print copies to keep on hand, risk profiles, and preservation recommendations, while also warning about retaining certain print materials to ensure access (Schonfeld and Housewright 2009).

OCLC Research has fostered numerous reports on issues involving print books. One report determined that libraries can realize save significant library space and cost if print books are deliberately and systematically outsourced for digitization to HathiTrust or parallel service provider (Malpas 2011). Another OCLC Research report looks at the implications and feasibility of forming "Mega-Regions" to consolidate print book in regional repositories across the United States (Lavoie, Malpas, and Shipengrover 2012).

Center for Research Libraries (CRL) using Print Archives Metadata Guidelines developed in conjunction with an OCLC pilot project for improved standardization (WEST 2012).

Center for Research Libraries (CRL)

of adults own a cell phone and are not just making calls: 82 percent take pictures, 80 percent text, 56 percent access the Internet and 50 percent e-mail (Duggan and Rainie 2012). Dahlstrom (2012) reports that 62 percent of students say they own a smartphone, and 67 percent of those who do "reported using their smartphone for academic purposes," a staggering 30 percent rise since 2011 (14).

Up from 4 percent in 2010, the Pew Internet and American Life Project found 25 percent of American adults own tablets (Rainie 2012b), and Gartner predicts that "

apps are tightly integrated with the capabilities of the device itself, using location data, motion detection, gestures, access to social networks, and web search, to seamlessly create a full featured experience" (10). Mobile apps have great potential for teaching, learning, and inquiry with "annotation tools, applications for creation and composition, and social networking tools," not to mention the possibilities from GPS, motion sensors, and a full suite of multimedia tools (Johnson, Adams, and Cummins 2012, 11). Beyond the mobile apps institutions create for themselves, the options and promise of external apps is seemingly endless. A distinct opportunity, the 2013 Horizon Report emphasizes that the app environment allows students to create their own "personalized learning environment" on their device, tablets specifically (Johnson et al. 2013, 15).

As demonstrated in the previous section, the wide variety of personal computing devices and technologies students are using means it is nearly impossible to design for and support every platform or brand. Institutions must "develop mobile IT strategies that allow for cross-platform compatibility, such as generic mobile apps and hybrid apps" and "prioritize the development or improvement of mobile friendly resources and activities students say are important" (Dahlstrom 2012, 31). Some web design experts argue an ultimate movement away from mobile sites and app culture towards responsive design, in which the design of the site automatically adapts to the size of the screen. However, the purpose of the site and factors such as user needs, budget, and frequency of updates can help inform institutions' decisions between mobile sites, native apps, and responsive design (Arora 2013). Though institutions must choose the best strategy for their scenario, there is no doubt of the urgency. The ECAR Study of Undergraduate Students and Information Technology for 2012 found that students "believe technology benefits them, especially with regard to achieving their academic outcomes and preparing for future plans" (Dahlstrom 2012, 19) and that the three most important things to them are progress information, course materials, and learning management systems.

Implications

- Though laptops still dominate the undergraduate student market share, tablets are making

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accessible no matter where we are or what device we choose to use" (Johnson, Adams, and Cummins 2012, 4).

As more people connect to the Cloud, so does their data, not to mention things. Today we are entering an Internet of Things (IoT) and "as more things, people, and data become connected, the power of the Internet (essentially a network of networks) grows exponentially" (Evans 2012). Gartner (2012) indicates that "smartphones and other intelligent devices just don't use the cellular network, they communicate via NFC, Bluetooth, LE and Wi-Fi to a wide range of devices and peripherals, such as wristwatch displays, healthcare sensors, smart posters, and home entertainment systems. The IoT will enable a wide range of new applications and services while raising many new challenges." The New Media Consortium (Johnson, Adams, and Cummins 2012) still sees the IoT as "more concept than reality" and places it four to five years out for impact, but notes the necessary technology ("smart sensors") is "well understood, easily mass produced, and inexpensive" (30). In the now, RFID tags are used at Northern Arizona University to track attendance via student cards, by marine biology researchers to "track marine animals' behavior" and at El Paso Health Sciences Center to keep tabs on "the location of science lab equipment and resources" (Johnson, Adams, and Cummins 2012).

Implications

- Cloud computing has many advantages, but thorough security assessment and risk analysis must be completed before outsourcing moves are made (Corn, Hubbs, and Nichols 2011).
- As library services platforms continue to flood the market, increasing numbers of

negatives, such as the inability “to analyze Big Data accurately and efficiently,” the threat of potential “power agendas,” and concern of “negatively [impacting] the lives of those who are already disadvantaged” (Anderson and Rainie 2012, 28, 33, 35).

In higher education, “data diggers hope to improve an educational system in which professors often fly blind” (Parry 2012b). Freedman (2012) argues that “colleges can use data to help students and faculty members monitor learning and teaching, and take adaptive actions in nearly real time,” but notes the challenges of academic systems being siloed for different functions. Grajeck and Pirani (2012) include “using analytics to support critical institutional outcomes” as a top ten IT issue for 2012, pointing out, “Institutions are under continued pressure from accreditors and public funding sources to demonstrate that student outcomes are improving and that institutions are being run efficiently. Students and parents are beginning to clamor for more direct and ‘real-time’ feedback by gaining access to the data that institutions collect about student performance.”

Examples of institutions taking the lead include Purdue University’s Course Signals, a “system designed to track academic progress and warn students in real time if they need to work on certain areas” and Austin Peay State University’s “Degree Compass, a course-recommendation tool inspired by similar systems at Netflix, Amazon, and Pandora” (Waters 2012). A pioneer in the use of data analytics is Arizona State University, which provides faculty with data dashboards pulling from their “LMS, as well as from web logs, swipe cards, and social media,” but is beginning to consider what vendors have to offer (Waters 2012). For libraries, big data helps facilitate more personalized services such as “beginning to share data to build tools for recommending and discovering books” (Parry 2012a).

Learning Analytics

subverted the efforts of individual institution willingness to participate in the VSA. As a result of the analysis and stakeholder input, NILOA made four recommendations (Jankowski et al. 2012):

- to continue the College Portrait learning reporting template in the VSA
- to retool the College Portrait web reporting site to be a more consumer-friendly communication tool for prospective students and their families as well as other audiences interested in student learning outcomes at an institutional level
- to expand the number of accepted student assessment tools in VSA
- to develop additional assessment tools and measures for inclusion in the VSA

Colleges and universities maintain that their missions make documenting value complex and daunting. A recent report authored by the National Research Council, Improving Measurement of Productivity in Higher Education,

goals of their colleges and universities. The summits themselves raised awareness of common organizational assessment challenges that librarians, campus administrators, and accreditation agencies shared, as well as an emphasis on individual cultural frameworks that each institution operates within. The summit resulted in five recommendations:

- Increase librarians' understanding of library value and impact in relation to various dimensions of student learning and success.
- Articulate and promote the importance of assessment competencies necessary for documenting and communicating library impact on student learning and success.
- Create professional development opportunities for librarians to learn how to initiate and design assessment that demonstrates the library's contributions to advancing institutional mission and strategic goals.
- Expand partnerships for assessment activities with higher education constituent groups and related stakeholders.
- Integrate the use of existing ACRL resources with library value initiatives.

The recommendations include two themes. The first is increasing the knowledge of the individual librarian in relation to the value that libraries bring to student learning. The recommendations include creating and articulating assessment competencies, providing professional development opportunities, and encouraging utilization of the tools and resources ACRL has and is developing for the ACRL Value of Libraries initiative. The second focus of the recommendations is centered on developing partnerships with internal and external stakeholders who share a common interest in demonstrating impact on student learning and success (Brown and Malenfant 2012).

In January 2013, ACRL announced that it was seeking applications from all types of higher education institutions for 75 teams to participate in the first cohort of "Assessment in Action: Academic Libraries and Student Success (AiA)." Librarians will each lead a campus team in developing and implementing an action learning project that examines the impact of the library on student success and contributes to assessment activities on campus. They will be supported in

attainment. As a result, the eight participating institutions were approached by JISC in 2011 to apply for funding for second phase of the project to gather more information and refine the results that may help academic libraries define their value to students and researchers (Stone and Ramsden 2012).

Researchers at the University of Wollongong demonstrate a correlation between students' grades and the use of library resources through the development of a tool to link student performance data sets with library resource use data. Preliminary research results show that students who access library resources more frequently perform better academically. The tool, Library Cube, standardized library use data, such as subscription database access, resource links for the learning management system to the university's student demographics and academic performance data sets. Data in the Library Cube [illegible]

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