

## Feature article

# Academic library assessment: new duties and dilemmas

*Denise Troll Covey*

### The author

Denise Troll Covey is Associate University Librarian, Hunt Library, Carnegie Mellon, Pittsburgh, Pennsylvania, USA.

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### Abstract

Two studies sponsored by the Digital Library Federation (DLF) aimed to discover the assessment practices, priorities, and concerns of academic libraries, and to propose next steps for addressing significant unresolved issues. One study surveyed and convened selected library directors to discern their priority assessment needs and design research to meet the most critical unmet need. The outcome of this study was a survey of how students and faculty perceive and use the entire information landscape. The second study examined the assessment practices and concerns of leading digital libraries. The problems identified indicate that current assessment efforts are often inefficient and ineffective because of inadequate skills, poor planning, cumbersome governance, and a fundamental frame of reference ill-suited to assessment. Libraries urgently need to synthesize and disseminate what they have learned from experience, organize assessment as a core activity, and audit and modify the beliefs, behaviours, and assumptions operating within their organization.

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Less than a decade ago, the World Wide Web appeared and began to alter dramatically library collections and services. The popularity of the Web, rapid development of new technologies, and accompanying changes in both the needs and expectations of users and the offerings of commercial information providers mean changing roles for libraries and librarians. Today it is a rare library indeed that does not have a Web site and an array of online resources. Development of the digital library precipitates massive change, not only in delivery formats and access methods, but also in work and workflow, staffing, the scope of library instruction, and assessment efforts. Whether collections and services are managed locally or remotely, whether licensed for a fee or freely available, Web access and capabilities have brought with them the need for libraries to engage in the design, management, and assessment of multimedia Web pages, portals, and products. Meanwhile, governments and institutions are clamouring for accountability. In a marketplace penetrated by technology and free and easy access to information on the surface Web – information of dubious quality for the purposes of higher education – academic libraries must compete for the attention of users or potential users, advertise their resources available on the deep Web, and somehow measure their impact on the learning and research outcomes of their institution.

To accomplish this feat, libraries have, by necessity, become more user-centered than ever before. Whether hiring personnel with specific expertise in human factors research or training existing librarians and staff to conduct user studies, libraries are conducting surveys, focus groups, user protocols, transaction log analysis, and other kinds of research to assess traditional and digital resource use; the usability of online resources; user needs, expectations, and satisfaction; and the quality of library services and facilities. They are grappling with how to assess research and learning outcomes, cost-effectiveness, and cost-benefits. Library literature and conference presentations urge and reveal library efforts to create a culture of assessment that will simultaneously improve the selection, design, and functionality of library resources and persuade supporters that the return on their investment in libraries is high. Given the economic, legal, and



political constraints within which libraries operate, upholding the core values of librarianship, accomplishing the institutional mission, and coping with the pace of change present significant challenges. The landscape is dotted with new duties and dilemmas.

Research conducted by the Digital Library Federation (DLF) indicates that libraries have common assessment needs, but diverse assessment practices. They frequently experience failure or only partial success in their assessment efforts. Individually, libraries are in many cases collecting data without really having the will, organizational capacity, or interest to interpret and use the data effectively in library planning. Collectively, libraries have been slow to standardize definitions and assessment methods, develop guidelines and best practices, and provide the benchmarks necessary to compare the results of assessments across institutions. This article addresses duties and dilemmas associated with creating a culture of assessment derived from DLF studies of assessment needs and practices.

### Context and methods

In October 2000, the DLF appointed Denise A. Troll, a Distinguished Fellow, to spearhead the DLF's usage, usability, and user support initiative and conduct two qualitative studies. The studies, conducted in parallel, explored academic library assessment practices, priorities, and concerns, and proposed next steps for addressing significant unresolved issues.

One of the studies aimed to identify the assessment priorities of library directors at small, mid-size, and large colleges and universities, and to develop and implement a research agenda that would address their highest assessment priority. To motivate selected library directors to attend a meeting convened by the Council on Library and Information Resources (CLIR), a white paper was written and distributed in January 2001, on the topic of how and why libraries are changing (Troll, 2001). In February, an informal exploratory survey of library directors was conducted to discover their top five assessment needs, what data they thought would enable them to address those needs, and the target audiences for those data. The results of this survey were analyzed and

presented at an invitational meeting of library directors in March 2001.

With almost lightning speed, the directors agreed that their highest priority assessment need was to discover what their community of users actually did when they needed information and what they did with the information they found. They agreed that their assessments of library use presented an incomplete picture of user behavior. Without an understanding of user activity in the broader information landscape, they were unable to interpret available trend data on library use or to develop effective strategic plans to improve library collections and services. The outcome of this meeting was a decision to commission Outsell, Inc., to survey academic users, to discover how students and faculty in different disciplines and different types of institutions perceive and use the broader information landscape. The study, currently underway with support from the Mellon Foundation, will:

- provide a framework for understanding how academics find and use information;
- examine changing patterns of use in relation to changing environmental factors;
- identify current and emerging needs of academic users;
- identify gaps where user needs are not being met; and
- develop baseline and trend data to facilitate strategic planning and resource allocation.

The results of the Outsell survey will help libraries focus their efforts, evaluate their current position in the information landscape, and plan future collections, services, and campus roles based on an informed rather than speculative understanding of academic users and uses of information (Dagar *et al.*, 2001). The final report will be publicly accessible on the DLF Web site. The data gathered during the study will be deposited with the Inter-University Consortium for Political and Social Research (ICPSR), where they will be accessible for non-commercial use. Following the study, the DLF will collaborate with library directors to assess how the research results help explain trends in library use, and how the results can inform strategic and organizational planning and the allocation of financial and human resources in academic libraries.

The second qualitative study was a telephone survey of the assessment practices and concerns of leading digital libraries. The results reveal how and why these libraries conduct usage and usability assessments, what they do with the data gathered in these studies, and the issues and problems they encounter in the process. All DLF libraries were invited to participate in the survey. Library directors were asked to submit the names of people at their institution to be interviewed. A total of 24 of the 26 DLF libraries responded, and 86 per cent of the individuals contacted at these institutions scheduled a telephone interview. From November 2000 through February 2001, interviews were conducted with 71 people. With one exception, the participating institutions were all academic libraries. The interviews took 30-60 minutes each. Most were individual interviews. A few were conference calls. Participants were asked a standard set of open-ended questions about the kinds of assessments they were conducting, why, how, what they did with the results, and what worked well or not so well in their experience. Follow-up questions varied based on the work being done at the institution. The results of the survey are not comprehensive or representative of library efforts, but indicative of trends likely to inform library practice. CLIR published the full report from the study in January 2002. The report includes detailed descriptions of popular assessment methods, sample research instruments, and a substantial bibliography (Troll Covey, 2002). The survey results reveal duties and dilemmas for digital libraries.

### The duties

Although libraries have traditionally assessed inputs, outputs, and, to a lesser extent, outcomes, the flurry of activity over the past few years to develop measures appropriate to digital library initiatives and to create a culture of assessment pinpoint new duties for libraries. The new era of accountability – to users, administrators, advisory boards, etc. – not only requires libraries to gather new data, but to analyze, interpret, and use the data effectively to improve library services, collections, and facilities. Given the pace of technological change, which according to Kurzweil (2000) doubles every decade, the

turn-around time between conducting an assessment and applying the results must be rapid. Otherwise the environment will change and the results will no longer be applicable, which means the investment of human and financial resources in conducting the assessment will be wasted. The detrimental impact of wasted effort affects library budgets, the quality and appropriateness of library resources, and the morale of both library personnel and the students and faculty who participate in the assessments. Libraries cannot afford to pay these costs.

### Problems encountered performing the duties

The results of the DLF telephone survey reveal significant problems encountered in conducting and applying the results of assessments and creating a culture of assessment. Although the study focused on usage and usability assessments, the results have broader application.

#### Focusing efforts to collect only meaningful, purposeful data

Many DLF survey respondents reported the difficulty of deciding what data to gather and how. Several common concerns were expressed:

- concern that the most readily available data might not be the most valuable;
- concern that valuable time is spent gathering useless data; and
- concern that useful data are not applied to full advantage if at all.

The significance of the issue has led several DLF institutions to assess their data-gathering habits. Task forces are investing considerable time studying current practice and making recommendations about what data to continue gathering, what data to stop gathering, and what data to begin gathering. Yet even when libraries know what data they need for their research purposes, gathering the data is at best problematic and at worst impossible. Some data gathering is beyond the library's control. Being at the mercy of commercial vendors and software developers who define and measure different user transactions differently is a well-known source of frustration for libraries needing comparative data. When libraries are in

control, gathering meaningful data can still be very difficult. Often the data gathered in library surveys, focus groups, think-aloud protocols, and other user studies are imprecise, difficult to analyze or interpret, or turn out to be inappropriate to the research purpose. Even when meaningful data are gathered, they can languish without being used. DLF respondents told stories of data frequently languishing because of lack of requisite skills, lack of comprehensive plans, or an ineffective organization of the assessment effort.

#### **Developing the skills to gather, analyze, interpret, present, and use data**

Different steps in the research process require different skills. Lack of skill at any step can imperil subsequent steps. For example, composing precise survey and focus group questions suited to the research purpose takes skill. Deciding what behaviors to observe in focus groups and user protocols and how to record these observations takes skill. DLF respondents reported many instances of data being difficult or impossible to analyze and interpret because the research instruments were poorly designed and inadequately tested. Poorly trained researchers can also jeopardize a study. DLF respondents described focus group moderators who could not effectively manage domineering participants or engage timid participants, or who had their own agenda or biases that drove the discussion. They described user protocols undermined by librarians who could not refrain from answering the participants' questions and assisting them when they had trouble performing the protocol tasks. In both cases, the researchers' behavior and lack of skill thwarted the success of the studies.

DLF respondents told stories of data gathered, but never analyzed, and data analyzed, but never used. Interpreting research findings was a particularly thorny problem, exacerbated when the data were imprecise or in conflict with other data or known trends, and when the research subjects were few or unrepresentative of the campus population. The difficulty of interpreting data led to disagreements and consequently delayed or eliminated formulating plans to use them. Even when data were carefully analyzed and interpreted, DLF libraries struggled with how to organize and present them to an audience for consideration in

decision making and strategic planning. Survey respondents knew that the quality of the presentation affects subsequent interpretation and decisions made based on the data. Many respondents explicitly expressed a need for training to enable more effective gathering, analysis, interpretation, presentation, and application of qualitative and quantitative data.

#### **Developing comprehensive assessment plans and realistic schedules**

The research process entails many steps:

- articulate the research purpose;
- assess the available human and financial resources;
- choose a research method appropriate to the research purpose and available resources;
- assign responsibilities;
- prepare the schedule;
- prepare and test the research instruments;
- get approval from the Institutional Review Board (IRB) to conduct research with human subjects;
- sample and recruit the research subjects and get their informed consent;
- conduct the study (gather the data);
- analyze and interpret the data;
- document and present the findings;
- develop plans to use the findings; and
- implement the plans.

DLF respondents reported frequent breakdowns in the research process because of inadequate planning, particularly in scheduling and marshalling the resources needed to complete the project. Poor planning created problems that cascaded through the research process and, when compounded by inadequate skills, doomed it to failure or only partial success. Though DLF libraries were able to frame critical research questions and envision the information needed to answer those questions, their assessment of available resources, selection of the research method, and assigning of responsibilities suffered two shortcomings. First, they focused on the resources needed to gather, analyze, and perhaps interpret the data. Resources needed to manage the project and complete the process – to document and present the findings, develop plans to use them, and implement the plans – were not addressed at the same level of detail. Second, they

sometimes chose a research method not well-suited to the skill sets of the people assigned to prepare and conduct the study. These oversights in the early stages of the research process had profound detrimental impact at later stages of the game.

Realistic scheduling is critical to success. Many DLF respondents reported underestimating the time it takes to accomplish different steps in the research process. Getting approval from the IRB to conduct human subjects research can take months. Sampling and recruiting research subjects can be difficult and time consuming. Analyzing and interpreting the data and documenting the research findings can take as much time as planning the project, designing the research instruments and procedures, and gathering the data. Problems with any step in the research process complicate subsequent steps. For example, developing plans to apply the results takes longer if the data are difficult to interpret. Reports from DLF survey respondents indicate that the greater the lag time between gathering the data and developing plans to use them, the greater the risk of loss of momentum and abandoning the study entirely. If plans are developed to use the research findings, the time it takes to implement the plans depends on the plans themselves and the competing projects and priorities, preferences and assumptions of the implementers – a clear signal that implementers should be involved in the early stages of the research process. The longer the entire process takes, the more likely that the environment will have changed and the results will no longer be applicable.

Comments from DLF respondents suggest that if the research process is not viewed from conception through application of the results and follow-up testing, the process could halt at the point where existing plans end; for example, with analysis of the data or documentation of the findings. The steps where the process is most likely to falter occur later in the process, but the problems actually start much earlier. Poor decisions made in the initial stages of planning, scheduling, and allocating resources surface later in the inability to analyze or interpret the data, effectively present the findings, make recommendations based on them, or implement the recommendations. Many DLF respondents reported data languishing without being used because commitment was

not secured from every unit required to complete a project or because the project fell behind schedule, so other projects and priorities intervened. Often insufficient resources were assigned or available to complete the process. Even when plans were developed to use the research findings, human and financial resources or momentum were frequently depleted before all of the serious problems identified in a study were solved. Limited resources typically restricted implementation to solving only the problems that were cheap and easy to fix. For example, assessments of library Web sites or digital collections resulted in superficial changes to the user interface, not changes to the underlying architecture, though it was the root of the significant problems users encountered.

The limitations of research results and the iterative nature of the research process also challenge DLF libraries. Survey respondents explained that additional research was often necessary to interpret usage data mined from transaction logs or to clarify or figure out how to solve problems identified in surveys or user protocols. When assessment efforts were abandoned for whatever reason or resulted in recommendations to conduct more research, people got discouraged. In the absence of a widespread understanding of the nature of research, discovering that investing time and money in multiple studies is necessary before concrete plans can be formulated and implemented hurts morale. DLF respondents commented that assessment can seem like an endless loop of methods and studies designed to identify problems, determine how to solve them, and verify that they have been solved. Sometimes it is tempting to step out of the loop and go with intuition or personal preferences, particularly if libraries do not have the human and financial resources to conduct needed follow-up research promptly. Nevertheless, DLF respondents agreed that libraries must stay focused on users. Assessment must be high priority and ongoing because user needs, expectations, preferences, and priorities change with time and technology. Maintaining focus, enthusiasm, and momentum is essential, albeit difficult.

#### **Organizing assessment as a core activity**

Many DLF respondents reported cases of collecting useless data and not applying

potentially useful data to decision making or strategic planning. They told stories of project sponsors who lost interest and shifted their attention elsewhere, stories of invisible or powerless project managers, and stories of personnel assigned to do tasks that they were unable or unwilling to do well. The picture they painted is not a picture of a culture of assessment or of an organization in which assessment is a core activity critical to the library's mission.

DLF respondents indicated that the procedure for sanctioning and assigning responsibility for research was related to the size, cost, and projected implications of the study. As the size, cost, and expected implications increased, the procedure became more formal and involved more people. Grant-funded projects attracted interest at the highest levels of the organization, but were just as likely to have vague plans and suffer from unrealistic schedules as internally-funded projects. Campus-wide surveys of user satisfaction with library resources and facilities engaged participation of library governing councils, committees, or task forces. Smaller, point-of-use studies conducted within a particular department did not solicit this level of attention or involvement – and consequently were more likely to succeed.

Comments from DLF respondents suggest that the larger the group or bureaucracy involved in any step of the research process, the longer the process takes, endangering the implementation or applicability of the results. Furthermore, the larger the group, the more likely the people involved will either lack the necessary skills or have personal agendas or biases that impede the process. DLF respondents reported research findings being rejected – and studies abandoned – because they challenged the assumptions and preferences of librarians or because the librarians did not understand the research method. The library culture that respondents described seldom exhibited the beliefs, behaviors, and assumptions of a culture heavily invested in assessment and called to accountability. Cumbersome governance is counter-productive to good customer service in a rapidly changing environment requiring rapid assessment and application of research findings.

### **Acquiring sufficient information about the environment**

DLF survey respondents shared the primary concern of library directors – not knowing enough about user behavior in the broader information environment to interpret existing trend data on library use. The forthcoming report by Outsell, Inc., on student and faculty perception and use of the information landscape will provide a context in which to interpret library trends.

### **Strategies to alleviate the problems**

The results of the DLF telephone survey suggest several critical next steps for libraries to increase the efficiency and efficacy of their assessment efforts. All of the steps entail synthesizing and disseminating to the broader library community what libraries have learned from experience.

#### **Develop guidelines, best practices, and standard instruments**

Libraries need to reduce the cost of trial-and-error efforts replicated at each institution, and leverage the investment many institutions have already made in training, professional development, and learning in the school of hard knocks. Synthesizing and packaging existing knowledge and expertise in the form of guidelines, best practices, and standard instruments, and disseminating them to the broader library community could remove some of the existing impediments to conducting user studies and increase the yield of studies conducted. For example, an outline of the key decision points and potential pitfalls in the research process would be an ideal way to share lessons learned the hard way through experience of frustration and failure. Standard, field-tested research instruments for commonly conducted assessments, like library Web-site design or facilities use, would enable comparison across libraries and avoid the cost of duplicated efforts in developing and testing the instruments.

#### **Develop “how-to” manuals and workshops**

Libraries need methodological guidance and training in the skills needed to conduct user studies. Many DLF respondents expressed an urgent need to learn how to use different

research methods effectively, to learn more about their strengths and weaknesses, costs and benefits, and how to negotiate the trade-offs. “How-to” manuals and workshops, developed by libraries for libraries, that cover the popular assessment methods (surveys, focus groups, and user protocols) and the less well-known but powerful and cost-effective discount usability testing methods (heuristic evaluations and paper prototypes and scenarios) would go a long way toward providing such guidance. A helpful manual or workshop would:

- define the method;
- describe its advantages and disadvantages;
- provide instruction in how to develop the research instruments, gather, and analyze the data;
- include sample research instruments proven successful in field-testing;
- include sample quantitative and qualitative results, along with how they were interpreted, presented, and applied to realistic library concerns; and
- include sample budgets, timelines, and workflows derived from real experience.

The results of the DLF study also indicate that libraries would benefit from manuals and workshops that provide instruction in the entire research process – from conception through implementation of the results, particularly if attention were drawn to key decision points, potential pitfalls, and the skills needed at each step of the process. Recommended procedures and tools for analyzing, interpreting, and presenting both quantitative and qualitative data would be helpful, as would guidance in how to turn research findings into action plans.

#### **Formulate a way to integrate assessment into daily routine**

Guidelines, best practices, standard instruments, and “how-to” manuals would no doubt facilitate assessment and increase return on the investment in assessment. However, more work needs to be done to turn library ethos and normative behavior truly into a culture of assessment, focused on user-centered evidence that drives decision making and strategic planning. Comments from DLF respondents indicate that libraries would benefit greatly from discussing and formulating a way to integrate assessment into

the daily fabric of library operations. To avoid generating unnecessary and unhelpful comments and participation, assessment must cease to be remarkable. It must become routine.

The profession could benefit greatly from case studies of those libraries that have successfully organized themselves to conduct research efficiently and apply the results effectively. Understanding how these institutions created a program of assessment – how they integrated assessment into the basic beliefs, assumptions, and daily behaviors of personnel, how they organized the effort, how they secured commitment of human and financial resources, and what human and financial resources they committed – would be tremendously helpful to the many libraries currently taking an *ad hoc* approach to assessment, struggling to organize their effort, and experiencing failure or only partial success. Including budgets and workflows for the assessment program would enhance the utility of such case studies.

#### **The dilemmas**

Libraries are in transition. Defining and measuring what they do, how much they do, and how well they do it is difficult, because what they do is constantly changing. Deciding what data to collect, how to collect them, and what to do with them are difficult challenges because library collections and services are evolving rapidly. New media and methods of delivery evolve at the pace of technological change. The methods for assessing new resource delivery and the skills required to conduct such assessments naturally evolve at a slower rate. Standards evolve even more slowly. This is the essential challenge and rationale for the efforts of the Association of Research Libraries (ARL), the International Coalition of Library Consortia (ICOLC), and other organizations worldwide to design and standardize new measures appropriate for libraries in the hybrid environment of traditional and digital resources. It also explains the fundamental difficulties involved in developing good trend data and comparative measures. Libraries evolve on different paths, at different rates, and offer different services or venues for service. Given the context of rapid and continuous change and diverse and frequently faltering

assessment practices, the new measures initiatives are essential and commendable. Without efforts on a national scale to develop and field-test new measures and build consensus, libraries would hesitate to invest in new measures and methods. Just as absence of community agreement about digitization and metadata standards acts as an impediment to libraries that would otherwise digitize some of their collections, lack of community agreement about appropriate new assessments acts as an impediment to investing in assessment.

Despite progress in the development and adoption of new measures and assessment methods, comments from DLF survey respondents indicate that the internal organization of many libraries does not facilitate the gathering, analysis, interpretation, and strategic use of assessment data. In many cases, libraries engage in purposeless data collection and resource allocation. What is urgently needed is not only better management of the research process, but also better management of library culture. Creating a culture of assessment is not simply a matter of developing and deploying new measures or acquiring new skills. It means changing the mind set and daily activity of librarians and support staff. The literature on change management makes it clear that organizations will pay for change (see, for example, Conner, 1992). They can either pay up front, by investing the time and resources to develop the frame of reference, skills, and motivation necessary for people to assimilate the change, or they can pay later, through failure and missed opportunities.

An organizational culture is an aggregate of subcultures, each of which shares an unconscious rationale for adhering to values, expectations, and activities that constrain responses to change. Changing a culture entails the conscious design, deployment, and maintenance of an infrastructure and frame of reference that define appropriate and inappropriate values, expectations, and activities. To change library culture into a culture of assessment, library administrators must understand and modify the frame of reference of library personnel to bring it into alignment with the beliefs, behaviors, and assumptions of the new culture. The task is admittedly daunting. In the context of rapid change and critical need for data and

accountability, libraries appear to be unwilling, unable, or unaware of the need to:

- articulate the beliefs, behaviors, and assumptions of a culture of assessment;
- assess the beliefs, behaviors, and assumptions of the existing culture;
- identify gaps between the current and desired frame of reference; and
- develop action plans to close the gaps.

Understanding and orchestrating a cultural frame of reference take time. However, a change imposed is a change opposed.

Research on organizational change indicates that if there is a discrepancy between the existing culture and the objectives of the proposed change, the existing culture will win (Conner, 1992, p. 176). The only options are to modify the proposed change to bring it into alignment with the existing culture, modify the existing culture to bring it into alignment with the proposed change, or fail.

Change management experts explain that sometimes you have to slow down to speed up the assimilation of change. The difficulty here is that libraries do not seem to have enough time – they need to conduct and apply the results of assessments now! Ironically, libraries have all the time there is. They can choose to use it wisely or wastefully. The results of the DLF survey suggest that libraries have chosen not to do the cultural audit and proactive orchestrating of a new cultural infrastructure, but rather to waste valuable time and resources by assigning people to manage and conduct assessments who lack the frame of reference, power, skills, and motivation to succeed. This choice is both uninformed and unfair to the good people libraries employ and those they aim to serve.

## Conclusions

The problems encountered and concerns expressed by respondents in the DLF survey indicate the urgent need for libraries to understand better the full scope and iterative nature of the research process, the different skills and time required at each step of the process, and the implications of how assessment is organized and governed. The current *ad hoc*, trial-and-error approach to assessment is not yielding a return commensurate with the libraries' investment.



To reap real and consistent benefits from assessments, libraries must pool their knowledge and experience, and organize assessment as a core activity integrated into the fabric of daily life as firmly and conspicuously as collection development and reference service. To accomplish this integration, library administrators must take steps not just to sanction individual assessment efforts, but to design and orchestrate cultural change within their organization. They must audit their culture, and identify and close the gaps between where they are and where they want to be. They must articulate, sanction, and legitimize with unwavering attention the beliefs, behaviors, and assumptions that ground and sustain assessment. Managers must share the new frame of reference, and be empowered to provide the training, rewards, and disciplinary actions necessary to change the culture and succeed at assessment. Libraries can either pay up front, by auditing and modifying their cultural frame of reference and taking the time to train and motivate their personnel, or they can continue to engage in purposeless data collection and resource allocation – in which case they pay later in failed or only partially successful assessments and the

morale problems this creates. The more cost-effective strategy is to pay up front.

## References

- Conner, D.R. (1992), *Managing at the Speed of Change, How Resilient Managers Succeed and Prosper Where Others Fail*, Villard Books, Random House, New York, NY.
- Dagar, L., Greenstein, D. and Watson Healy, L. (2001), *Dimensions and Use of the Scholarly Information Environment*, Digital Library Federation, Washington DC, June, available at: [www.diglib.org/use/grantpub.pdf](http://www.diglib.org/use/grantpub.pdf)
- Kurzweil, R. (2000), *Promise and Peril: Deeply Intertwined Roles of 21st Century Technology*, presentation at the Earthware Conference, Carnegie Mellon, Pittsburgh, PA, 19 October.
- Troll, D.A. (2001), "How and why are libraries changing?", white paper commissioned by the Digital Library Federation (DLF), available at: [www.clir.org/diglib/use.htm](http://www.clir.org/diglib/use.htm) Revised and published in 2002 as "How and why libraries are changing: what we know and what we need to know", portal: *Libraries and the Academy*, Vol. 2 No. 1, pp. 97-121.
- Troll Covey, D. (2002), *Usage and Usability Assessment: Library Practices and Concerns*, Council on Library and Information Resources, Washington DC, January, available at: [www.clir.org/pubs/reports/pub105/pub105.pdf](http://www.clir.org/pubs/reports/pub105/pub105.pdf)