

GRADUATE STUDENTS AND THE ACADEMIC LIBRARY: WHAT DOES THE FUTURE HOLD?

INTRODUCTION: SETTING THE SCENE

I began my sabbatical research with what seemed a defined but narrow focus: the information literacy needs of graduate students. The Information Literacy Standards of the Association of Colleges and Research Libraries (ACRL) provided a reasonable foundation upon which to build, and a qualitative research design, sampling a number of graduate students at Carleton University, is a productive strategy.

My project has since evolved in unexpected but distinctly broader and more challenging directions. I found, through ongoing reviews of existing literature, as well as through my own personal experience and discussions with colleagues, that some work has already been done to identify the concerns and needs of graduate students. Further, I discovered that there is a growing body of research aimed at identifying gaps and suggesting best practices.

It has become clear to me that issues related to information literacy among graduate students are best addressed within the broader context of graduate education at the local, regional and global levels. Designing library programs and services for graduate students begins with a clear understanding of the evolution of graduate education, as well as the different expectations of governments and the private and not-for-profit sectors with respect to graduate skills, national innovation strategies and success within a knowledge-based economy. This is true for graduate education training in general: research training must accommodate specific professional requirements.

Two documents provided a starting point for my investigations. The first of these was the 2007 Canadian Graduate and Professional Student Survey (CGPSS), in which Carleton University participated; the second is the discussion paper published as a result of a Tri-Council, Society for Teaching and Learning in Higher Education (STLHE) and Canadian Association for Graduate Studies (CAGS) workshop in the summer of 2007 on professional development for new researchers.

(The CGPSS Survey results can be viewed at http://oirp.carleton.ca/surveys/cgpss_summary.pdf. The CAGS document is included here as Appendix A)

The CGPSS survey results for Carleton provided interesting data on the satisfaction of graduate students with:

- the program, the faculty, and the institution chosen;
- support for professional skills development;
- quality of the research experience;
- financial status; and
- quality of student and social life.

The discussion paper “Professional Skills Development for Graduate Students” identified a small core of professional skills that should be available to all graduate students. The four proposed skills are: communication, management, teaching and ethics — all drawn from a larger list that included critical and creative thinking, research management, knowledge mobilization and knowledge translation. Taken together, these two documents helped me to outline key topics with which to understand and describe issues, challenges and creative options for academic libraries that are seeking to orient themselves within the global environment for graduate education in the twenty-first century.

In order to gain a better understanding of the broad context for graduate education during the coming decades, my research expanded to include a review of major organizations involved in graduate student research and education, as well as relevant issues, challenges, initiatives, publications, partnerships and advocacy. Organizations prominent in Canada and the U.S. proved essential in defining the landscape for graduate research education. The Canadian Association for Graduate Studies, the Association of Universities and Colleges of Canada (AUCC), the Ontario Council of Graduate Studies and the Council of Graduate Schools, amongst others, provided direct entry into this area of research. Key debates, key government agendas/policies, important advocacy groups, defining documents and research programs were highlighted. The Canadian Association of Research Libraries, the Association of Research Libraries, and the Association of Colleges and Research Libraries (ACRL) provided the same spectrum of information with respect to the academic library environment and graduate student research and education support.

Some of these organizations are covered in detail in this report, and several key documents are referenced. Important publications include:

- *Canada’s Innovation Strategy*, presented in two papers, which provides “a blueprint for action so that, by the end of this decade, Canada is known throughout the world for its culture of excellence, learning and innovation”;
- “Momentum”: the AUCC 2008 report on university research;
- the Create Change Canada website;
- “Challenges to Innovation in Graduate Education”;

- the “synopsis of the International Conference of the Canadian Association for Graduate Studies, 2005”;
- “Doctoral Education in Canada, 1900–2005, a paper presented in 2005 by CAGS for the Conference, “Forces and Forms of Changes in Doctoral Education” at the Center for Innovation and Research in Graduate Education of the University of Washington;
- the series of Killam Lectures — particularly the 2005 lecture, “Investing in Higher Education: The Responsibility of the University”; and,
- “Re-envisioning the Ph.D.: What Concerns Do We Have?”, the report of a lengthy research project undertaken in the U.S. and supported by the Pew Charitable Trusts. (Appendix C)

The 2006 series of essays, “Envisioning the Future of Doctoral Education” — published in relation to the Carnegie Initiative on the Doctorate, which began in 2001 — is also very stimulating and forward-looking. (See Appendix D.)

This reading provided a broad lens through which to review the literature on academic library support in general, and graduate information literacy in particular. This review became an around-the-world journey, as library science research in this area, while fledgling, is global in extent with innovative ideas, initiatives and programs being developed in the U.S., Australia and the U.K. These papers and reports on best practices, and graduate students’ research behaviours, attributes and attitudes towards their libraries — all against a backdrop of higher education research on “professional skills” training — proved insightful, and greatly clarified the benefit of established information literacy standards within the library and information world. They also pointed to the need for further elaboration of those standards within the context of a knowledge-based economy, interdisciplinarity, and globalization. The idea of transferability is still to be explored within the context of ACRL Information Literacy Standards and information literacy (IL) instruction, as measured against the backdrop of professional skills training.

A review of best practices and programs addressing graduate student training, whether academic or professional, highlights the singular importance of co-ordination and collaboration for successful implementation of any training program. Departments and faculties of Graduate Studies are essential partners, and communication across the breadth of the university community is key.

The final recommendations for Carleton University Library’s support of graduate information literacy are based on the foundation of a co-ordinated and integrated service that addresses issues of co-operation within the

library and university communities. Graduate information literacy workshops must be embedded within a service that is unified and that recognizes that its success rests, to a certain extent, on partnerships, communication and on-going research. There are also — as is the case at Carleton University’s Library, where much graduate instructional support is academic in content and focus, occurs at the request and with the participation of faculty, and is focused on particular course assignments — ways of extending and enhancing workshop content to address professional skills mandates from government, funding councils and employers. My recommendations reflect that unifying philosophy, which is fast becoming a trend within graduate education.

STARTING POINTS

The Canadian Graduate and Professional Student Survey (CGPSS)

Carleton University participated in this survey, along with other Ontario universities having graduate programs, as well as with some of the Group of Thirteen universities (G13): leading research-intensive universities in Canada. This is a biannual survey, first conducted in 2005 at selected Canadian and American universities. The questionnaire was developed at MIT, based on three pre-existing surveys from Rutgers University, the Higher Education Data Sharing Consortium (HEDS) and the Consortium on Financing Higher Education (COFHE). The 2007 survey — the first year it was hosted in Canada — was revised for a Canadian context. The University of Toronto and other G13 universities participated in the 2005 survey.

Summary results of Carleton's participation were posted on the Office of International Research Programs (OIRP) website.

The CGPSS Survey Profile

- 40,000 Master's and doctoral students were surveyed, with a 42% response.
- 62% were Master's students: 88% full time and 55% women.
- Social Sciences represented 19.8%; Engineering, 16.2%; Health Sciences, 13.8%; Humanities, 11.2%; and Business Management, 9.9%.

Key Findings

- 76% would “definitely” or “probably” recommend their university to someone considering their program.
- 71% would either “definitely” or “probably” select the same university if they were starting again.
- 86% gave a high rating to the overall experience at their university.
- Students received financial support from multiple sources (teaching and research assistantships, fellowships, federal and provincial scholarships).
- Poor ratings from more than 10% of respondents included “student office space”, “career services”, “professional skills development” and “financial aid office”.

Carleton's Profile

2,613 were surveyed with a 36% response (929,567 Master's and 362 doctoral).

General Results

On average, Carleton respondents reported the highest levels of satisfaction with their program, their academic experiences, and their advisor/thesis experience.

Areas with the lowest level of reported satisfaction were professional skills development and many university resources. This was a noticeable difference when compared to the rest of Ontario.

Under "University Resources" both Master's and doctoral students were negative with respect to other Ontario universities in their rating of library facilities.

Library skills were not specifically covered in the list of professional skills that received lower ratings than other Ontario universities. Identified skills were "preparing for candidacy exams", "standards for academic writing", "publishing", "career options within and outside academia" and "research positions".

Professional Skills — The Canadian Association for Graduate Studies (CAGS)

The CAGS professional skills development discussion paper (2008) broadens the discussion from the areas covered in the CGPSS survey. The areas surveyed therein related primarily to academic skills and academic professional opportunities. The CAGS paper clearly separates disciplinary knowledge and disciplinary technical skills from broader skills that "can be improved with practice, that require reflection and that benefit from ongoing coaching."

I have appended the discussion paper, to which I refer the reader for details. [Here, however, I want to highlight potential outcomes and the general orientation desired, as well as overall motivations behind the demand for more focused programs in the area of professional skills. There is no doubt that the area of "professional skills" within higher education is a topic for consideration worldwide, by governments, universities, employers, and students and/or researchers themselves. The Government of Canada is cited in the CAGS document for drawing attention to, and actively encouraging, the consideration of programs designed to strengthen the ability of graduate students to make important contributions within a knowledge-based economy.

The goal of the CAGS paper was to “begin a dialogue related to [professional] skills, so that institutions, departments, and individuals can identify gaps in their offerings, and so that as a community we can identify opportunities for filling the gaps. The long-term vision is to provide a network of programs across the country so that all graduate students can develop these skills.”

Specific considerations were then addressed, providing a foundation for any inventory of desirable professional skills. This is particularly relevant, given the increasing tendency for graduating doctoral and Master’s students to seek employment outside of academia. Skills relevant to government and public sectors, as well as to private and not-for profit-organizations are important. This is the underlying thought dictating the range of skills to be targeted.

Nine areas of professional skill related to libraries and librarianship were presented, including “critical and creative thinking”, research management, and ethics. While information literacy is not directly identified, one can point to links with the goals and competencies described in ACRL’s Information Literacy Standards (2000). It is pertinent and timely for academic libraries to participate in these discussions of professional skills. It is also important for them to promote information literacy within their organizations as part of a core set of professional skills, and to offer their expertise to university administrations with respect to organizing, creating and presenting generic skills workshops. It is also pertinent for libraries to reflect on how they might adapt to professional skills agendas that do not specifically address information literacy, and to find ways of connecting with the broader issues and concerns of graduate students.

Information literacy standards have been developed and put into practice largely within undergraduate contexts. The Learning Commons over the last 10–15 years has realized the goal of providing one-stop information literacy support for students as a means of helping them with writing, time-management, numeracy and citation practices, amongst other skills. Graduate information literacy is less structured, and resides within the collaborative context of the library subject specialist and department graduate co-ordinators and faculty. Graduate students would not necessarily describe their library needs using the language of information literacy, although their need to produce a thorough and accurate literature review, to manage their research data, and to engage in critical thinking would certainly fall within the parameters of information literacy, as it is commonly understood.

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One of the first steps in this sabbatical study involved an exploration of the broad context for academia in general, and academic libraries in particular. Having been active in academic staff association and union affairs for three years prior to undertaking this research project, I became increasingly aware of the evolution in graduate education in Canada and internationally, as well as the issues and pressures from both the public and private sectors. This engagement came from listservs tracking higher education affairs locally, and internationally, and attendance at conferences, meetings and workshops sponsored by organizations such as the Ontario Confederation of University Faculty Associations (OCUFA), the Canadian Association of University Teachers (CAUT) and STLHE. A term as President of the Carleton University Academic Staff Association (CUASA) during a collective bargaining year provided working insight into the academic enterprise and its governance.

This broad perspective is complimented by my role as Instruction Librarian from 1995 to the present at Carleton. During this period, I have been able to oversee the evolution and expansion of traditional bibliographic instruction through the articulation of information literacy at Carleton, while also collaborating with colleagues at other libraries in Ontario, in Quebec and across Canada. I have also been an active partner in Carleton's teaching and learning initiatives, from university orientation activities to support for faculty teaching through workshops and presentations. This experience has extended to participation in significant program endeavours, such as the implementation of the first-year seminar (FYSM) in the Faculty of Arts and Social Sciences (1997) and the planning and implementation of the Learning Commons (Fall 2005).

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Library Instruction — now entrenched as Information Literacy — has been reviewed formally in Canada through two national surveys completed in 1995 and 2000. Professor Heidi Julien of the University of Alberta has been involved in both. Commencing in 2000–2001, new data was collected, culminating in 2005 with the report, “A Longitudinal Analysis of Information Literacy in Canadian Academic Libraries”, which details a three-year in-depth analysis of information literacy instruction in Canada. The study focused on questions relating to how instruction is organized, delivered and evaluated, and notes that, “The research is intended to increase understanding of and to advance that instruction.” The results of the longitudinal study are compared to the surveys completed in 1997 and 2000, and comparisons with similar studies in the U.S. and internationally are mentioned in the document's conclusion.

The above study offers some interesting discoveries that are pertinent to the present sabbatical research. Because the study is the only longitudinal research in the country on information literacy, it provides a useful backdrop from which to explore issues relating to graduate student

information literacy needs, and opens the door to issues yet to be addressed. With relevance to information literacy, Julien, in her literature review section, quotes from Whitehead and Quinlan (2002, Canada: An information literacy case study), that “information literacy initiatives . . . remain on the margins of the education process . . . much to the detriment of Canada’s workforce and economic potential.” Coupled with this troubling observation is the recognition that the main focus in Canadian colleges and universities remains on first-year students, with a “clearly growing interest in undergraduates in certain disciplines and teaching staff (faculty).” The graduate student community is not specifically recognized in answers to any of the survey questions — including questions about instructional objectives and the challenges to information literacy initiatives.

Two unexpected findings of the survey were that “a significant proportion of respondents believed that librarians had no responsibility to teach an understanding of some ethical, economic, and sociopolitical information issues,” and that one in five respondents believed that librarians bore “no responsibility for teaching how to think critically.” As Julien points out, this is at odds with ACRL standards (2000) and the best practices promoted by ACRL (2003a). Julien’s interpretation is that “clearly”, the standards are not widely accepted in Canada.

The observations and findings noted above are important within the broader context of higher education and the role of academic libraries in providing support for the graduate student community. It is problematic if the lack of support for ACRL standards is widespread and entrenched. This suggests an underlying desire to restrict the scope and involvement of information literacy instruction at a time when universities, employers and governments are keen to enlist the expertise and experience of higher-education faculty and librarians. In my introduction — and in response to the CAGS discussion paper in particular — I suggested that, “It is also pertinent for libraries to reflect on how to adapt to ‘professional skills’ agendas that do not specifically address information literacy, and to find ways to connect this particular literacy with broad graduate student issues and concerns.” Clearly, in a higher-education environment that is global in nature, and where there is a mandate to support a knowledge-driven economy and life-long learning, there is a need to address the future of library programs as part of a broader national and international agenda.

Issues relating to the pedagogical qualification of librarians — and confusion as to the goals and objectives of library instruction programs — need to be resolved within the context of trends in higher education generally, and not predominately or exclusively within the context of a narrow view of library history. Graduate education is facing new challenges, and voices outside the university environment are driving the higher-education agenda. Librarians are well placed to enhance the

evolution already underway — to be leaders in theory and in practice. The graduate student community will be better served if librarians approach the potential for graduate programs and services in a holistic manner. There are opportunities to extend and enhance the role of libraries and librarians in support of graduate education, and increasing numbers of libraries, library organizations and librarians are bridging the gaps to be creative and to redraw the boundaries that have tended to keep traditional roles intact.

From this perspective, it is important for libraries to remain abreast of issues and developments within higher education in general, and graduate studies in particular, in an organized and consistent manner. The concerns of graduate research education now have global consequences extending beyond the purview of individual institutions, and indeed of the university sector itself. Envisaging library programs and support for graduate research education will be progressive and sustainable if approached in a broadly interactive manner.

ASSOCIATIONS – NATIONAL AND INTERNATIONAL

There are many associations — local, national and international — which are actively concerned with matters pertaining to graduate education. This section of the report will review some of the key organizations, the key issues and challenges with which they are engaging, and policies/programs that they are putting in place to help build a foundation for development and change within the graduate research education sector.

The Canadian Association for Graduate Studies (CAGS)

The Canadian Association for Graduate Studies (CAGS) has already been introduced with reference to professional skills training as an important dimension of graduate education. CAGS is a not-for-profit organization whose mandate is “to promote graduate education and research in Canada.”

The Association’s members include:

- 60 universities and colleges across Canada offering graduate programs;
- two national student organizations;
- the three research granting councils: the Canadian Institutes of Health Research (CIHR), the National Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council (SSHRC);
- UMI as a sustaining member; and
- eight corresponding members, including the Council of Graduate Schools, the Ontario Council on Graduate Studies, Library and Archives Canada and the UK Council for Graduate Education.

The Association holds an annual meeting in the fall of every year. It also produces publications on topics of relevance to graduate studies and students, and issues a number of statistical reports on graduate enrolment. Professional skills development was included on the 2007 and 2008 conference programs. Other topics include supervision of graduate students, intellectual property, recruitment, research ethics and disciplinarity/transdisciplinarity. News from funding councils is regularly reported, and issues in graduate education from around the world are reviewed. The Association also publishes other reports of interest, as well as the annual series of Killam Lectures.

Challenges to Innovation in Graduate Education, a synopsis of the International Conference of the Canadian Association for Graduate Studies

(2005), outlines challenges and opportunities to graduate education. Identified challenges include international mobility, disciplinarity and transdisciplinarity, policies of innovation, public and private partnerships, ethics and ethical issues, globalization, indigenous peoples, and women in academia. Overall, technological innovation provides challenges and opportunities for universities in adapting to change: “to strive for social integration, [and] to reengineer the academic institution as a social partner in a society in constant flux.”

Academic libraries could note a re-iterated emphasis on attending to a wide array of professional skills (as already outlined), as well as other points. Discussions around the issues of disciplinarity and transdisciplinarity, the large number of graduate students who choose to pursue non-academic careers, and an emphasis on educating for flexibility in terms of collaboration and networking, both locally and globally, are all areas of concern for libraries. There is obviously a need to reflect upon how libraries perform fundamental collection-building in a knowledge-based economy that is increasingly engaged in interdisciplinary research in which adaptation to globalization is critical. Team-teaching to address transdisciplinarity is another function that forces libraries to consider a less fundamentally traditional department-based service.

The Canadian Association of Research Libraries (CARL)

CARL is the leadership organization for Canada’s research library community. The Association’s members include the 27 major academic research libraries across Canada, Library and Archives Canada, the Canada Institute for Scientific and Technical Information (CISTI), and the Library of Parliament. CARL members are the backbone of Canada’s intellectual holdings in all disciplines, spending over \$700 million each year, with monograph holdings of over 85 million items, and over 1.2 million journals.

CARL provides leadership to Canada’s academic research library community by enhancing scholarly communication and assisting members in providing full support for postgraduate study and research. CARL’s mission is to increase the ability of individual member libraries to provide effective support and encouragement to advanced study and research at the national, regional and local levels.

CARL has embraced *Canada’s Innovation Strategy* (2002, presented in two papers), as reflected in its revised mission statement, its areas of interest, and its basic goals. These basic goals are:

- providing organized leadership for the Canadian research library community in the development of policies and programs which maintain and improve the cycle of scholarly communication;
- working towards the realization of a national research library resource-sharing network in the areas of collection development, preservation and access; and
- increasing the capacity of individual member libraries to provide effective support and encouragement to postgraduate study and research at national, regional, and local levels.

The Association's areas of interest include automation, collections inventory projects, copyright, joint purchasing consortia, preservation and resource sharing.

CARL is working towards these goals through advocacy and partnerships. There are currently committees established in the areas of copyright, scholarly communication, government policies and legislation, as well as working groups on data management and institutional repositories. Important involvement with external committees includes representation on the Canadian Consortium for Research, and the Scholarly Publishing and Academic Resources Coalition (SPARC).

In 2007, a new Strategic Plan was announced. It would be a rolling plan, evaluated on a yearly basis, and would function as a continuation and affirmation of the organization's guiding pillars: leadership, scholarship and stewardship. There would be one major focus in each of the above areas: achievement of copyright reform through legislation, advancement of open access initiatives, and commitment to the development of Alouette Canada, respectively.

In addition to these major on-going concerns, CARL has also introduced discussion and exploration of e-learning and library education. In addition, fruitful discussions at the Association's 2006 Fall General Meeting regarding "research assets", and the desire to establish a more proactive role for librarians in research undertaken at Canada's academic institutions, have broadened the strategic agenda.

For my study of the ways in which academic libraries can support graduate education and research, the significance of CARL's strategic vision and planning became crucial. In many ways, individual libraries — whether CARL members or not — are benefiting from the organization's strategic articulation and implementation. The attention focused on technological innovation and the support for consortial purchasing, institutional repositories, open access, resource sharing and digital preservation is a fact of life for any school offering graduate programs. Government investment in the research agenda demanded by the evolving knowledge economy

recognizes the interdependence of the research community at large, as well as the interdependence generated from within academia.

Expanding interest in e-learning has direct implications for the provision and evaluation of instructional support for graduate students, while the Create Change Canada website highlights the opportunities for new ways to access, use and share research resources. The challenge for individual libraries and library staff is to organize and optimize the research agenda in all its aspects — to understand that providing materials, services and instructional programs will be more appropriate and beneficial if based on a global, interactive and co-operative model that works within the broadest possible environment, which is also open to consideration of the importance of contextual factors governing research.

In practical terms, this has both an internal and external agenda within an evolutionary landscape: libraries must review their organizational structures to ensure that global, transdisciplinary and regional and local needs and resources are optimized. Programs and services for users must become broader and more dynamic in order to draw tomorrow's researchers and teachers into a coherent understanding of the scope of modern research endeavours, and the roles played by different sectors of the non-academic world. The challenge is to balance the local and the disciplinary with the global, transdisciplinary and professional workplace.

The Association of Universities and Colleges of Canada (AUCC)

The Association of Universities and Colleges of Canada (AUCC) is the voice of Canada's universities. It represents 94 Canadian public and private not-for-profit universities and university-degree-level colleges.

Since 1911, it has provided strong and effective representation for its members, in Canada and abroad. AUCC's mandate is to facilitate the development of public policy on higher education, and to encourage cooperation amongst universities and governments, industry, communities, and institutions in other countries. The services provided by AUCC focus on public policy and advocacy, communications, research and information-sharing, and scholarships and international programs.

In 2005, AUCC began to report to the public on the state of university research and knowledge mobilization. In 2008, with its *Momentum* report, AUCC provided a detailed assessment of Canadian R&D, "particularly the activities of and the funds flowing to the university sector and the resulting progress and benefits." The report identifies five drivers of change:

- heightened recognition worldwide of the critical links between university R&D and national prosperity and quality of life;

- the global race for research talent;
- the growing costs and complexity of university research;
- increased emphasis on measuring outcomes; and
- the strong impetus to partner across institutions, sectors and geographic boundaries.

These drivers of change provide on-going challenges for university administrations in light of the increasing administrative, coordination, compliance and other institutional costs that result from increased demand for research.

In the section of the report on performers of research in Canada, there are a number of facts about university participation in R&D that are notable, not only for university administrators, but also for library managers and staff. As the report notes:

“ . . . the university sector is the second largest performer of research in Canada at 36% of R&D activities, and this is significantly larger than the OECD average or in key comparator countries such as the US and the UK; universities perform most of Canada’s basic research; most Canadian-based research in the social sciences and humanities takes place at universities and universities support most of the research in these fields with institutional funding; university research is widely dispersed geographically in all ten provinces; the proportion of research activities has increased significantly from 1995 to 2005 in all provinces except in NFLD and Labrador; universities have a wide range of research activities, established research relationships with other sectors, a presence in more than 80 communities across Canada and research agreements in many countries around the world.”

In terms of the investment of academic libraries in research, in 2007, 54.4% of overall funds were provided by external investors, while 45.6% came from the universities’ own resources. This is an increase of over 150% from external funding sources between 1993 and 2007. This has resulted in an increase of 90% over 1993 levels in spending from universities’ operating budgets to finance the unfunded institutional costs of research conducted for external investors. Operating budgets have also had to contend with a 42% increase in full-time enrolment over the same time period.

Public investment for the past ten years has been designed to create an internationally competitive and sustainable research effort that has focused on four foundational elements:

- developing, attracting and retaining highly qualified research talent;

- creating and maintaining cutting-edge research infrastructure and facilities;
- producing new ideas; and
- providing institutional support (people, infrastructure and facilities, direct costs and institutional costs of research).

It is important to remember that libraries are covered under institutional costs. In 2003, the federal government established a permanent Indirect Costs Program to help alleviate the institutional costs of federally funded research projects and programs, in the order of 25% of the total direct costs of research funded by the three federal granting agencies. This is one of a number of flagship programs — which also include Canada Research Chairs, Canada Graduate Scholarships, the Canada Excellence Research Chairs, the Canada Foundation for Innovation (CFI), granting agencies' Research Tools and Instruments program and Major Facilities Access Grants programs, the Canadian Advanced Network and Research for Industry and Education (CANARIE), Centres of Excellence for Commercialization and Research, Networks of Centres of Excellence, and Genome Canada — introduced by the federal government to address the four foundational elements of university research. Today, effort is focused on achieving the optimal mix and level of investments.

Libraries and researchers have benefitted from the 1997 creation of the Canada Foundation for Innovation (CFI), first through the Canadian National Site Licensing Project (CNSLP), then through the Canadian Research Knowledge Network (CRKN): a 72-member partnership of Canadian universities dedicated to expanding digital content for the academic research enterprise. CRKN, through a co-ordinated leadership of librarians, researchers and administrators, undertakes large-scale content acquisition and licensing initiatives to build knowledge infrastructure and research capacity. From initial investment in journals and citation databases in science, technology and environmental fields in 2001, to 2008 and \$47 million for digital scholarly content aimed at transforming social sciences and humanities research at Canadian universities, CRKN is playing a major and on-going role in expanding and developing easier access to digital research resources for research across all the disciplines.

AUCC's advocacy and public policy initiatives highlight the research landscape in Canada, and cast important attention on the achievements and challenges affecting the evolving research ecosystem. Libraries can greatly benefit from an on-going commitment to staying abreast of the larger issues and challenges of the research environment, as well as through the exploration and co-ordination of new and continuing library programs and services for graduate research and education. As the research landscape makes partnership and collaboration across different sectors and geographic regions more critical, academic libraries need to evolve

organizationally and strategically to maximize their participation in the evolving ecosystem, while responding with greater flexibility to demands for public accountability and an articulation of their value and contribution to Canada and to society. This will mean establishing new roles for libraries and librarians, as traditional structures are found inhibiting or regressive.

This past year, AUCC's magazine *University Affairs* offered a series of podcasts hosted by Carolyn Watters — Dean of Graduate Studies at Dalhousie University, and President of CAGS for 2009 — about the issues shaping graduate studies in Canada. Watters talks to other deans, faculty, postdocs and graduate students about where graduate studies are headed, both within Canada and internationally. The topics covered have included dedicated space for graduate students, both social and academic; tri-council funding issues — particularly SSHRC's recent targeted funding decisions; quality assurance of graduate programs; careers and leaving academia; and transition to, and preparation for, graduates entering corporate culture. CAGS has recently posted a set of Guidelines for Graduate Supervision for use by individual institutions across the country, and is continuing the process of providing guidelines for professional skills development. Additionally, Dean Watters and Associate Deans Sunny Marche and Dieter Pelzer have been posting weekly blogs for the past three years on topics of relevance to graduate studies in Canada.

Of particular interest for this report is the May 2009 blog in which Watters responds to a posting by Marche about institutional failures in the education of graduate students: “So it seems we are producing PhD graduates who are generally unable to explain their work to an informed lay audience, and who have a poor understanding of the economics of their work.” Watters does not disagree with the observations, but does assert that “universities across the country are showing a growing awareness that graduate students and postdocs need professional competencies that complement their academic knowledge.” She then outlines some of the help that can be provided by both faculty supervisors and university management in terms of providing opportunities for presentations: both formal and informal and courses or workshops that give students practice speaking to different audiences about their work, and sessions which help them to understand the economics of their research, while also assisting them in assessing its value and cost. Again, the discussion comes back to a broad idea of professional skills training that should become part of a university's graduate studies mission — including the mission of its academic library.

Graduate students themselves are recognizing the need to gather, discuss and debate issues of relevance, even urgency, to graduate studies. The Graduate Student Associations (GSAs) of 13 Canadian research-intensive

universities have begun to come together for an annual conference to discuss issues of general concern. I refer to the G13 Graduate Student Association Conference held at the University of Alberta this year, and Dean Watters's podcast interview with two GSA Presidents, Ben Whynot (Alberta) and Craig Schloss (Waterloo), on the topics of space and graduate funding, including professional development funding.

On another front, the G13 — a group of leading research-intensive universities in Canada, formed over 10 years ago as an informal biannual meeting of university executive heads, which is primarily concerned with joint programs — submitted a response to the Competition Policy Review Panel on “Sharpening Canada’s Competitive Edge”, in which they emphasized a dual focus for Canada: becoming a destination for talent, and becoming a global leader in innovation. They identified three areas for improvement: immigration, accreditation, and funding to achieve these goals. On the funding issue, they recommended increased support for the institutional costs of government-funded research, support for targeted as well as longer-term basic research, seed or investment funds, and continued support for university/industry collaboration as well as programs and tax-based incentives to recruit and retain Master’s and doctoral graduates. They also emphasized the value of differentiating research-intensive universities (as in California and Germany).

The Council of Graduate Schools (CGS)

One final group that belongs to this stage of the report is the Council of Graduate Schools (CGS) in the United States. Its mission is “to improve and advance graduate education in order to ensure the vitality of intellectual discovery.” CGS accomplishes its mission through “advocacy, innovative research, and the development and dissemination of best practices,” and further states that “supporting graduate education is critical to achieving the highly skilled workforce needed for the U.S. to compete effectively in the 21st century global economy.”

CGS has been active as an organization for over four decades, and currently recognizes a membership of 500 universities in the U.S. and Canada, as well as 16 international members. The Canadian Association of Graduate Studies is an affiliate member.

There are two aspects or areas of interest and research for which CGS is providing leadership, momentum and research that are particularly interesting within the current graduate research environment: the establishment of a seven-year PhD Completion Project, and the launch of Graduate Education 2020: an annual symposium dedicated to establishing a national conversation on the future of graduate education globally. As noted in CGS literature, “The Ph.D. Completion Project is a seven-year,

grant-funded project that addresses the issues surrounding Ph.D. completion and attrition. The Council of Graduate Schools (CGS), with generous support from Pfizer Inc and the Ford Foundation, has provided funding in two phases to 29 major U.S. and Canadian research universities to create intervention strategies and pilot projects, and to evaluate the impact of these projects on doctoral completion rates and attrition patterns. An additional 15 partner universities are currently participating in various aspects of this project. The Ph.D. Completion Project aims to produce the most comprehensive and useful data on attrition from doctoral study and completion of Ph.D. programs yet available.” McMaster University (Hamilton, Ontario), the Université de Montréal and McGill University (Montreal) are the Canadian participants.

Six institutional and program characteristics emerge as key factors which could influence student outcomes, and perhaps affect the likelihood that a particular student will complete a Ph.D. program: selection, mentoring, financial support, program environment, research mode of the field, and processes and procedures. An important theme — and one that reiterates some of the CAGS and GSA focus — is the role of the university at large in providing an environment that encourages “high expectations, high performance and strong student support.” Much of the thrust is towards the creation of spaces, including a Graduate Student Commons for social and academic interaction. There is also an emphasis on promoting workshops on possible graduate student services, retention and development.

The Council of Graduate Schools has also been active on the global front. In 2007, CGS, in partnership with the Government of Alberta, hosted the first global summit on graduate education in Banff, Alberta. It involved 27 participants from government, diplomatic circles, universities and other stakeholders from North America, Europe and the Pacific Rim to discuss opportunities and challenges created by the globalization of graduate education. The summit’s main focus was to share best practices and to discuss international collaborations and joint degrees. The main result of the summit was agreement on a set of governing principles to guide future collective and collaborative work to advance and improve graduate education:

- Respect and learn from the differences in programs and their modes of delivery directed towards our common goal.
- Promote the quality of graduate programs.
- Develop global career competencies and awareness in graduates.
- Encourage innovation in programs and graduates.
- Clarify and strengthen the role of the Master’s degree.

- Promote high-quality inter-university collaborative programs across national boundaries.
- Review and understand the global flow of graduate students and postdoctoral fellows (early-stage researchers).
- Engage stakeholders — e.g., employers, policymakers and universities— to improve and advance graduate education in a global context.
- Establish an inclusive global platform for discussion of best practices in graduate education.

To summarize, the summit and other CGS initiatives point to a number of areas of interest and challenges for academic libraries. These include:

- The importance of the wider perspective of graduate education in North America and Canada.
- The documented concerns of current graduate students (space, support services, professional skills).
- Stakeholders beyond the individual researcher, his/her department and faculty and university.
- Demands for both disciplinary expertise and broader professional skills expertise and training.
- The role of libraries in the evolving graduate education landscape.

THE ACADEMIC LIBRARY AND HIGHER EDUCATION RESEARCH

Doctoral education research provides a broad and foundational starting point for an understanding of the issues, challenges and opportunities facing academic libraries in their desire to contribute to successful doctoral programs and doctoral student experiences. As has been noted, moreover, the nature of doctoral education is changing, and universities are having to rethink the goals and outcomes necessary for the expanded roles facing today's graduates. Stakeholders, from government to the private and not-for-profit sectors, are demanding graduates with transitional skills already in place. There is a requirement for a meta-consciousness and a meta-reflection component for entry into the world outside of academia, institutional programs and individual learning goals. Libraries must find their way into this evolution — and into the discussions that are helping to shape doctoral education into the twenty-first century.

Although there has been much debate worldwide concerning doctoral training and professional skills training in the last 15 years, Canada has only recently become engaged. Presentation of the discussion paper on professional skills — through a joint Tri-Council, CAGS and STLHE effort — is the first official foray into this area. It is not clear how this will affect program initiatives, either at a national or local level — national standards and funding being key concerns at this point.

Université de Sherbrooke — “Researchers for Tomorrow”

In a 2008 *University Affairs* article entitled “Researchers for Tomorrow”, Professor Jean Nicolas — a mechanical engineer and Chair for Innovation in Research at the Université de Sherbrooke — writes about the strengths and weaknesses of doctrinal training, and makes suggestions for enriching the traditional training model “in and through research”. The article points to the key drivers of change, increased graduate student enrolment (24,000 to 35,000 PhDs from 2000 to 2006), and the diverse career paths awaiting current and future graduates. He underscores the depth and originality underpinning disciplinary research, and the apprenticeship methods through which students pass from users to creators of knowledge. Students learn to formulate important research questions, to reconfigure and adapt complex knowledge, to solve new problems, to explain discoveries, and to submit them to evaluation. Perceived weaknesses have also been identified — particularly research that is too narrow, too individualized, too local and/or too closed-minded. He points out that personal and professional skills have not been sufficiently developed, based on employers' perspectives from a 2004 NSER workshop. In addition, questions have

been raised about a results orientation, with evaluation focused less on the training of the researcher and more on the research results. The lengthy study period is also seen as problematic.

Professor Nicolas points to creative examples and experiments aimed at improving or enriching the one-model-fits-all agenda; he also identifies important reports and outlines a learning experiment at his home institution. In the United States, the Carnegie Initiative on the Doctorate, and the Integrative Graduate Educational Research Trainingship (IGERT) program — launched by the National Science Foundation in 1997 — are now supporting more than 150 projects. In the United Kingdom, the New Route PhD, and training programs set up to apply the recommendations of the Seven British Research Councils outlined in their Joint Skills Statement (2004), have prioritized the following skills: research know-how, understanding the research environment, research management, personal effectiveness, communication know-how, teamwork and networking skills, and career management. The Université de Sherbrooke experiment is a systematic approach to providing integrated training and supervision of researchers. It involves professors, students, and external experts from the faculties of engineering, science, medicine and health sciences. It offers unique activities designed to improve interdisciplinary collaboration, enrich skills, widen frameworks, encourage an enhanced sense of responsibility, and ensure quality. This is accomplished through specifically designed workshops linked to students' projects, the creation of advisory committees, and the outlining of a doctoral path for good research practices.

Professor Nicolas concludes his article by suggesting two challenges that Canada faces with respect to doctoral training:

“The first challenge is to launch a significant debate in Canada on doctoral training. We need to reflect carefully, take an inventory of the existing knowledge, and involve the principal players, namely, professor-researchers, students and employers. It is also necessary to convince governments and granting agencies to invest in improving the human and intellectual potential of our young researchers and not merely invest in the commercial value of research; in the words of well-known urban studies scholar Richard Florida, in "leveraging talent, not technology.

“The second challenge will be to encourage research-action projects with the dual objective of reinforcing the quality of training in and through research and, secondly, better preparing doctoral candidates in their role as agents of progress in society. If Canada wishes to become a leader in researcher training, it must support projects based on the triad of training, supervision and quality assurance. It would be useful to encourage inter-university and inter-sector partnerships (academic, private, public) in training, as is

already the case in other countries and as we already do in research. Funding could come from granting agencies, government departments of education and employment, and philanthropic foundations, which are very active in this field in the United States.

“Embarking on this major undertaking will allow us to restore to training in and through research the vital importance it deserves by responding to the challenge posed by the "transfer" of graduates towards a diverse range of occupations. Canada will then be in a position to benefit from the full potential of its investment in the training of researchers, who will then go on to become important agents of progress in society.”

Academic libraries need to become part of this debate, and to contribute to the enriching of doctoral training through collaboration with key inter-university partners, through the development and assessment of training workshops already in place, and through suggestions for enhancing the research-related skills training program. This should involve a meta-cognitive approach to research that helps to define a “research path” from start to finish. The professional skills debate should not overshadow the disciplinary or academic skills that must be honed by students during candidature; however, libraries must accept the challenge of orienting training to foster transferable skills and open doorways to the world beyond academia. Libraries can contribute to, and benefit from, external partnerships, collaborations and exchanges. The many reports, experiments and programs developed within the international arena provide examples, advice and knowledge on the graduate-education issues generated by a knowledge-based economy. Professor Nicolas references some of the key documents and projects, and adds to these with the description of a local experiment. Academic librarians must commit to systemic involvement with graduate education, from the global to the local dimensions, and from the perspectives of academia to those of the external sector, and they must become aware of relevant experiments, models and programs.

Within the current context of librarianship there is renewed emphasis on librarians developing, enhancing or extending their roles as researchers (another iteration of the librarian/scholar), thus implicating librarians in any discussions of the context for research. This means that librarians should be organizing themselves to contribute to the knowledge economy, and to understand and develop the professional skills required to engage in the research environment as effective communicators, leaders and managers. There is thus an imperative for librarians to become oriented to, and fluent in, the educational discourses around doctoral training that are broadly based and up to speed with current pedagogy, policy and practice in Canada, the United States, and around the world. This way, when as librarians we propose and plan services for graduate students, we are aware

of the broadened context for such programs and are able to approach our roles as facilitators from within and without.

With respect to doctoral education, there seems to be agreement on two main points: doctoral training involves both disciplinary and professional aspects; and graduate education, including information literacy training, is not simply an extension of undergraduate training and support, but involves “unique and specialized needs”. Libraries and librarians in academic settings have traditionally focused on disciplinary support, providing a mixed program of general orientation to library resources and services, more specialized workshops covering such areas as bibliographic management tools, and specific department- and/or course-based workshops and consultations. It has been noted, moreover, that “library-based instructional services for graduate students have received limited attention to date” and that, “Despite the vast amount of literature devoted to increasing the information literacy of college students, surprisingly little has been written about information literacy for graduate students.” In 2008, librarians from the University of Western Ontario’s Taylor Library noted that there does seem to have been some growth in research on library use and information literacy amongst graduate students in recent decades.

GRADUATE STUDENT INFORMATION LITERACY – NEW ROLES AND NEW SERVICES

Exploration of the literature relating to the information literacy of graduate students reveals an eclectic and geographically diverse range of material. Conference reports or papers describing research studies of graduate information behaviour, including feelings of anxiety and perfectionism with respect to library use, are available through library science databases. Specialized studies of information literacy for particular disciplinary areas, such as the arts and social sciences, or business or social work, etc., are in evidence. Examples of best practices, innovative programs and approaches are also reported upon. Less frequently, articles examining the pedagogy or theoretical underpinnings of graduate information literacy appear. Much of this conversation is restricted to the fields of library and information science, with occasional forays into the broader area of graduate education and generic skills training. Inventories of best practices and discussions of the information needs and behaviour of graduate students are more potent and forward-looking when framed and integrated within the global issues identified in the literature on graduate education. *Additionally, the planning of graduate information literacy programs within academic libraries must look to support and complement technological innovation, collection development and the access services that support graduate education.* The traditional departmental structure, when organized through functional models, exerts a negative pull away from the co-ordination and collaboration that is needed to accomplish the educational support that must follow for a robust evolution of libraries.

The American Association of Research Libraries (ARL)

ARL is a not-for-profit membership organization comprising the libraries of North American research institutions, and operates both as a forum for the exchange of ideas, and as an agent for collective action. There are currently 123 members, including Canadian research libraries and Library and Archives Canada (LAC).

ARL's mission is to "influence the changing environment of scholarly communication and the public policies that affect research libraries and the diverse communities they serve. ARL pursues this mission by advancing the goals of its member research libraries, providing leadership in public and information policy to the scholarly and higher education communities, fostering the exchange of ideas and expertise, and shaping a future environment that leverages its interests with those of allied organizations."

Libraries must evolve in tandem with the changing face of graduate education, and the American Association of Research Libraries has begun to address this imperative through strategic planning that embeds the discussion of library roles in research, teaching and learning within the broader context of graduate studies. Inspired by the 2007 Council of Graduate Schools (CGS) white paper, “Graduate Education: The Backbone of American Competitiveness and National Security”, ARL and the Coalition for Networked Information co-sponsored the “Forum on Enhancing Graduate Education: A Fresh Look at Library Engagement” in the fall of 2007. The Forum identified four key challenges for graduate education:

- to produce graduates who can work with agility;
- to produce graduates working at the frontiers of knowledge creation;
- to produce graduates who are intellectual innovators; and
- to produce graduates who can think synthetically.

These challenges were a direct response to the identification of five guiding assumptions or trends within the CGS white paper:

- that a highly skilled workforce, working at the frontiers of knowledge creation and professional practice is crucial;
- that evaluation and improvement of all aspects of graduate program quality is needed;
- that interdisciplinary research and education are central;
- that greater diversity in the graduate student population is necessary; and
- that there is an imperative to produce globally competent scholars, scientists and citizens.

The Forum included presentations on the changing nature of graduate education, academic and research behaviours among graduate students, and the perspectives of graduate students. Breakout sessions on discovery, access, research, scholarship and interdisciplinarity rounded out the discussions. *The Forum encouraged academic libraries “to consider new ways to partner in the broad graduate community.”* The unifying themes were co-operation across sectors, enhanced flexibility within, and a focus on interdisciplinarity and globalization. The discussions did elicit creative responses to help define new roles and new structures for a supportive,

flexible academic library. The needs expressed by participating graduate students were considered, and the need for on-going communication with this key library user community was emphasized.

Some of the suggestions for new roles and new services and programs include innovative and creative ways of facilitating communities of scholars through the development of physical and virtual spaces for collaboration, cross-disciplinary dialogue, skills workshops, meeting rooms, etc. and for creation of virtual spaces to foster sharing of ideas, papers and so forth. This might include:

- the creation of thought centres, meeting rooms and virtual spaces for the sharing of content;
- innovative approaches to discovery and access services and tools — services that would be targeted and engaging, include community-oriented recommender systems, service models offering 24/7 service, online tutorials, peer learning and frequent librarian/student contact;
- newly created roles such as copyright manager and digital librarians;
- adapting traditional funding models to support interdisciplinary approaches and programs;
- involving graduate students in collection development; and
- developing interdisciplinary tools to facilitate language issues in database searching.

While the scope and themes governing the Forum discussions were diverse, several key points can be made. The evolution and implementation of services and programs within academic libraries must take place within the context of on-going research on graduate education, and with particular focus on the changing environment for graduate studies from interdisciplinarity, to global perspectives, to the changing outlooks and expectations of graduates themselves and potential employers, and to government stakeholders. While there are many suggestions for new roles, new or enhanced library services and tools, these must be undertaken in partnerships within and across institutions. Although not explicitly addressed, graduate information literacy can be effectively articulated only within the broader context of community engagement. This implies a challenge to include internal university partners (graduate studies for one, but also bodies and officials responsible for institutional research endeavours) and external national and international libraries and librarians. The focus on graduate student spaces, the encouragement of flexibility with respect to institutional research configurations, and the need for agility and

flexibility in response to an environment of constant change, apply equally to the development of instructional programs.

The success of graduate and professional skills instruction requires a coherent and unified academic context. The commitment to providing a variety of spaces to accommodate graduate student endeavours (from collaboration, to meeting and workshop spaces) that are quiet and monitored is conducive to a reflective environment for disciplinary and cross-disciplinary research. The exploration of new technology and new tools to support interdisciplinary research will encourage institutional projects and those of related research institutes and centres. *One of the most innovative suggestions, of particular relevance to the instructional agenda, is the suggested need to add “production” to the suite of services and to the library’s conceptual model dominated by discovery and access.* This model could include multi-media labs or production areas with tools, software and equipment to create something new. Other useful extensions to traditional services include support for data and information management, and the creation of spaces to store student research content, data and images, while also organizing this material for access and retrieval.

The Association of Colleges and Research Libraries (ACRL)

Many institutions in Canada and the United States are currently working towards providing focused and enhanced graduate support. At the most recent ACRL Conference in Seattle — “Pushing the Edge: Explore, Extend, Engage” — librarians from the University of South Florida (Tampa) and Florida State University reported on and led a panel discussion: “Beyond the Basics — Casting a Net to Provide Customized Research Services for Faculty and Students”. *Both institutions’ libraries reorganized their reference departments in order to provide more customized service for graduate level and faculty research. The University of South Florida created a Research Services and Collections Unit, and Florida State University created a Scholars Commons to better support research needs.*

The panel addressed three topics: strategies for learning more about faculty research, potential new and customized services, and the library as place for serious research. Some interesting suggestions and proposals were brought forth: environmental scans of research and curriculum; investigation of research grants and bibliometrics, as applied to faculty research; institutional repositories, embedded library support, and course content created collaboratively with faculty within course management systems; and new roles, including grant writing, data services and pages with RSS feeds. Some of these suggestions are certainly appearing consistently within the library association literature: *the emphasis on*

proactive involvement in institutional research is beginning to be articulated, and the reorganization of services and the creation of research spaces are now definite trends.

From the perspective of library instruction in Canada and the United States, ACRL — the largest division of the American Library Association, with over 12,000 members — is the most active and influential body in terms of establishing information literacy standards, providing information relevant to the field, and offering training of library professionals for their teaching role through its summer institute. The Information Literacy website offers important links to information literacy topics — including a definition of, and introduction to, information literacy, and important links to resources and ideas and to ACRL professional activities in support of information literacy.

The standards for information literacy in higher education are available as part of a standards toolkit, a tutorial and other advice on their use. The major focus of these standards is the presentation of broadly applicable indicators and student learning outcomes, particularly in relation to undergraduate education. Since the publication of the standards in 2000, ongoing elaboration has focused on adaptation of the standards for specific academic disciplines such as literature and, most recently, political science, sociology and anthropology. The environment for ongoing research, with respect to much information literacy and bibliographic instruction, continues to be the teaching, learning and research environment for higher education; however, given the evolving nature of that environment, and particularly the changing context for graduate education, there are challenges to be met. The unique needs of graduate students, the interdisciplinarity of much graduate and doctoral level education and research, the emphasis on collaborative and problem-based learning methods, the professional skills requirements of employers and the research and development agendas of government departments and agencies, suggest the need for further enhancements and extensions to the original principles and articulations of information literacy standards.

From this perspective, the Research and Scholarship Committee of the Instruction Section of ACRL has been revising and updating the Research Agenda for Library Instruction and Information Literacy, which was originally published in 1980. Organized under four headings — Learning, Teaching, Organizational Context and Assessment — the agenda touches upon some of these issues, and provides direction for research in these areas by posing specific questions. While questions related to graduate study are not specifically formulated, new user populations are noted as changes that provide challenges, and graduate students are cited within this context. Under Teaching, it is acknowledged that, “the development of Information Literacy involves a more holistic approach to determining the educational needs of students.” Under Organizational Context, the need for

developing institutional and other types of partnerships is emphasized, as is the need to co-ordinate information literacy standards with “other professional organizational standards, etc.” Under Assessment, it is proposed that “future research in the areas of assessment, evaluation and transferability needs to address involvement from other stakeholders and programs need to show that skills learned are transferable from one discipline to another, from secondary school to higher education and beyond.” (See full document in Appendix A)

This provides some impetus and direction for continued research into more specialized information literacy and library instructional programs. In particular, the emphasis on partnerships, assessment and transferability has acute relevance for graduate studies, as does the pedagogy and methodology underpinning graduate library instruction. If the needs of graduate students are unique, and not simply an extension of undergraduate needs, this should be reflected in information literacy standards and competencies. Other relevant literacies should be investigated, and the pedagogy should reflect the widening horizons influencing higher education. The applicability of library instruction programs employing group- and problem-based learning methods — of instruction librarians extending their teaching to cover ethics, and to make more explicit the relationship of discipline specific or research skills to workplace skills — is a desirable area of investigation and practice.

ACRL’s broad strategic priorities for 2009–2013 are also relevant when looking to the future of support for graduate studies and research. These priorities include the following resolutions:

- to strengthen relationships with higher-education organizations in order to develop institutional understanding of librarians’ roles in enhancing teaching and learning;
- to enhance ACRL members’ understanding of how scholars work, and the systems, tools, and technology to support the evolving work of the creation, personal organization, aggregation, discovery, preservation, access and exchange of information in all formats;
- to increase the recognition of the value of libraries and librarians by leaders in higher education, information technology, funding agencies and campus decision making; and
- to support members in their exploration, research on, and implementation of new and emerging information technologies and their application for library services in educational environments.

These short-term strategic priorities are aimed at placing libraries and librarians at the centre of the evolving environment of higher education. The implication and mandate for libraries is to be proactive and to provide leadership within the academic institutional context.

Understanding the needs of graduate students and researchers, and providing supportive programs, services and technologies, requires a global focus from libraries and librarians, and the institutions of which they are a part. Designing graduate information workshops that work towards developing research and professional skills competencies is challenging, and requires specialized knowledge and research on trends in graduate higher education. Librarians may be wary of stepping outside the confines of strictly defined academic roles, but universities as a whole are also being required to extend their traditional academic focus in order to address the needs of federal and provincial government research agendas and the skills base required by the for-profit and not-for-profit employment sectors.

Academic libraries generally are well suited to assume a leadership role combining, as they do, characteristics that are at once academic and service-oriented, research-based and support-based. Librarians are themselves graduates of professional programs, but are also researchers, with an intimate knowledge of the nature and value of professional skills, as well as of the research skills and methods needed for success in a disciplinary context. This is a duality that libraries must continue to build upon and market.

BEST PRACTICES/INNOVATIVE PROGRAMS

DISCIPLINARY SKILLS

There are many descriptions in the literature of higher education and library science offering examples, best practices and whole programs that experiment with different approaches to graduate education within the global and interdisciplinary contexts they describe. This report will present a review of some of the most exciting and progressive of these approaches. To set the context for appreciation and assessment of these examples, it is instructive to suggest a set of parameters by which to provide for focused discussion and further research. These parameters are: organizational context (both internal and external); service and program support; and partnerships. Whatever the home for these programs and other initiatives in support of graduate learning and research and professional development, the success of any endeavour is directly related to the institutional environment and the partnerships that secure the evolutionary foundation.

International examples from the United States, Europe, the U.K. and Australia are often dynamic, and evince an integration and financial investment from government, down through universities and other national and regional organizations. Canadian examples are appearing as well — including the Université de Sherbrooke's integrative program, noted above. Other research-intensive universities such as Dalhousie and York are engaged in research and task forces to explore the training and other support services needed by graduate students. It remains for the three research councils and other government agencies to invest with funding support, in order to leverage more initiatives and innovative programming within this context.

Canada

Libraries and librarians in Canada are emerging with a distinct interest in the education of graduate students, and are conducting their own research, designing their own programs, and addressing the broad needs of their graduate population in other ways as well. The University of Ottawa has delivered on the issue of space needs with the creation of a dedicated graduate space in the main Morisset Library. Comprising an entire floor, the space is monitored by graduate students and offers lockable study carrels, group study rooms, a large reading room and offices for the Graduate Student Association. With respect to graduate instructional support, libraries are orienting themselves to more precisely understand and address the unique needs of graduate and research students — most often in conjunction with individual graduate departments and graduate program faculties, but independently as well.

For example, librarians from the Allyn and Betty Taylor Library — one of the seven locations that make up the University of Western Ontario’s library system — conducted just such a research project in 2006 and described the endeavour in an article, “Library Research Skills: A Needs Assessment for Graduate Student Workshops” in *Issues in Science and Technology Librarianship*. The Library served the faculties of Science, Engineering, and Health Sciences, as well as the Schulich School of Medicine and Dentistry. The core of the needs assessment focused on a list of proposed workshop topics, and students and faculty were asked to rate how useful they found each topic. The draft of proposed workshops was based on L.G. Ackerson’s six-step model for graduate-level library research: searching subject indexes, identifying review articles, searching for ancestors, searching for descendants, identifying key documents, and current awareness. The final list of proposed topics was: Introduction to Western Libraries, Scholarly Communication Process, Search Strategies, Selecting Subject Databases, Identifying Key Research Papers, Library Research for the Literature Review, Keeping Current with Scholarly Literature, Writing the Research Paper, Ethical Use of Information and Introduction to RefWorks. The research confirmed the usefulness of the proposed workshops (with some changes), and endorsed the appropriateness of offering the workshops as part of a general or common, non-mandatory program. Graduate students opted for the RefWorks, Keeping Current, and Searching for Information workshops as the most likely to be useful.

In 2009, librarians from Queen’s University reported on the results of their graduate student needs survey at the Ontario Library Association (OLA) Conference. The research identified similarly reported needs: how to keep current; how to write literature reviews; how to find patents, statistics, geospatial data; and how to get published. The response led to a workshop — conducted by Mary Claire Vandenburg, Research and Instruction Librarian and Morag Coyne, Undergraduate Services Librarian — titled “Grad-Level Research Tools: What You Need to Know”. The workshop was publicized by Grad Studies at the University, and was attended by fifty students. In contrast to the Allyn and Betty Taylor Library workshops, the Queen’s University presentation was tool-based, focusing on Google Scholar, WorldCat, Citation Alerts, Journal Citation Reports, JCR and RefWorks.

Both the University of Western Ontario and Queen’s University initiatives represent library outreach, presented outside specific subject areas and outside of class time. Attentiveness to the information literacy of graduate students, the research that provides direction, and program design, may be pertinent as separate library initiatives, with or without buy-in from other university sectors, as in these two examples. The programs are academically focused, but are experimenting with different delivery

contexts. As a first organizational consideration, in an environment of evolving agendas, it may be crucial to consider developing different suites of workshops covering broad subject areas, and clearly delineating responsibilities campus-wide to address academic skills instruction, and to help distinguish academic streams from more professional skills concerns.

The United States

Academic advisors play key roles in the graduate learning process, and in the transition from undergraduate learners to graduate researchers, and should be consulted on the needs for instruction in information literacy skills. How best to achieve student and faculty buy-in continues to be problematic — it may well be that changes to instructional methodologies and practices should be investigated, and different strategies put in place. In 2008, librarians at Oregon State University, based again on internal discussion and needs assessments, embarked on a series of service enhancements, appointing a graduate student services coordinator and establishing a graduate student services committee to “begin implementing library-based graduate student services.”

It was agreed to use “the context of the literature review process” to provide a nexus point for graduate information literacy, to use Arlene Fink’s Guide to preparing a literature review as a theoretical foundation, and to adopt a conference-style workshop approach to work towards greater student engagement. The program proved highly successful, with its combination of theory and practical resources. Future plans following upon this success involve the creation of an online version of the course, exploring the special needs of international students and mature students, and incorporating faculty perspectives into the literature review process.

Australia

The Oregon State University experience proved instructive on the importance of finding a key information need upon which to develop a graduate information literacy course with wide applicability, and of using the conference-style approach to help increase student buy-in. Another interesting example of addressing a broadly relevant information literacy topic — personal research information management — is reported on by Paul Genoni and Jan Partridge in “Information Literacy Around the World: Advances in Programs and Research in 2000”. The authors’ qualitative research project, Personal Research Information Management (PRIM), undertaken at Curtin University of Technology in Western Australia, was based on the assessment that “the research student is faced with far more challenging tasks in terms of storing, structuring, collating and recalling information over a much longer period than has been required during the learning phase,” and that the “information literacy skills which made

students successful learners will not naturally also make them successful researchers.”

The objectives of the research were to study the research methodologies used by ten doctoral students in a number of humanities disciplines, at various stages in their research studies; to provide an analysis of how they collect, store, retrieve and manage their research data; and to review supervisor skills, expectations and experiences in relation to personal research information management. Information management was defined as the ability “to organize, store, manipulate and re-gather information after it has been transferred from the public realm into the private domain of the information user and personal research information management as the exercising of these skills using large scale data sets compiled in the course of personal research.” PRIM identified weaknesses in the personal research information management skills of students involved, and deficiencies in support, IT resources and supervisors’ knowledge of information management, especially of computerized options. The lack of conceptual tools, particularly information or data mapping, was also identified.

The PRIM project focused particularly on the student/supervisor context with respect to information management, but concludes with a section on implications for university policy and practice. Clearly, this is an area that extends beyond the narrow student/supervisor relationship to other key university sectors. The library is not mentioned as a participant in this project; however, libraries can provide much-needed support in this area. This is an important opportunity for academic libraries and librarians to move beyond traditional boundaries and establish themselves in less familiar roles. A suite of courses addressing information management by developing the skills needed to “collect, store, collate, retrieve and use information,” could be jointly offered through the expertise of data centre librarians, general reference staff and IT specialists. While students and faculty would not generally look to libraries for leadership and instruction in this crucial aspect of information literacy, it is an area in which the Canadian Association of Research Libraries, for example, is very active, having established the Research Data Strategy Working Group as a “collaborative effort to address the challenges and issues surrounding the access and preservation of data arising from Canadian research.” This multi-disciplinary group of universities, institutes, libraries, granting agencies, and individual researchers recognize the pressing need to deal with Canadian data management issues. Together, they focus on the necessary actions, next steps and leadership roles that researchers and institutions can take to ensure that Canada’s research data is accessible and usable for current and future generations of scholars (see Appendix E). Both the Oregon State and Curtin University research and program responses, together with the Canadian examples, reflect a traditional concern with information literacy even as they address gaps and issues

within graduate education. Libraries are beginning to address the needs of graduate students within the context of defined academic and disciplinary requirements. The results are exploratory and innovative within this context; it remains to broaden the discourse, the mission and goals of the traditional pedagogy and practice of information literacy within the evolving context for graduate education.

PROFESSIONAL SKILLS

Information literacy, as elaborated in ACRL Standards and other documents and standards worldwide, has evolved within the academic context of disciplinary focus and a student/faculty/librarian infrastructure. The skills elaborated deal with a substantive research agenda, and the partnerships encouraged are among the three groups: students, faculty and other service providers. With continuing recognition of the complex and unique information literacy needs of the graduate student body — poised as they are to transition from learners to creators of knowledge — information literacy is only just beginning to respond and adapt to the evolution within graduate education.

The added imperative, articulated internationally, to include professional skills training as a function of academia, is a challenge for universities to accommodate within the current economic environment. This is especially true, given the unfamiliarity with a professional skills training agenda and challenges relating to the establishment of support services designed to implement an effective and broadly based program for such skills training. This is an agenda that demands co-operation and co-ordination university-wide if it is to attain the goals published by important external stakeholders: currently the Tri-Council, CAGS, and the 2008 STLHE statement of principles on key professional skills for graduate students, to target the Canadian context.

Canada — University of Guelph

Canadian universities are beginning to take note of this new imperative, giving rise to new initiatives. This report has outlined professional skills initiatives at the Université de Sherbrooke, but there are others. At the 2009 Canadian Association of College and University Student Services (CAUSS) conference, Maryann Kope, Learning Services Co-ordinator at the University of Guelph, gave a presentation on the Guelph Graduate Student Learning Initiative (GSLI) that began in 2006. Maryann Kope described GSLI as a collaborative partnership of the Learning Commons, Graduate Studies and the Graduate Students Association (GSA) to support the development of professional skills for graduate students. In 2007, GSLI received a Students Affairs and Services Association (a division of

CACUSS) Innovation Award. Some of the service areas incorporated into the program included writing support services, information technology, career and teaching assistant (TA) support, and library research support. GSLI received direction from Graduate Studies and the Director of the Learning Commons, and established a working group made up of student association reps, Academic Affairs and Student Affairs staff. The GSLI mandate is to share information across sectors, to promote services jointly, and to collaborate in the creation of new services.

GSLI has had a number of successes, including common branding and collaborative workshops and courses, and completion of a major needs analysis survey. There have been notable successes with faculty made aware of available services through regular reports at the Board of Graduate Studies. From a library perspective, the needs survey suggested that students are generally unaware of the availability of “liaison librarians”, and that students prefer to deal with their research and information management needs on their own. Future programming does, however, target research skills and software skills.

GSLI is instructive, in that it is a very broadly based initiative with buy-in from Graduate Studies and contact with the Office of Research on campus. There is program evaluation in the context of the Tri-Council Statement of Principles, and awareness of the Grad Student Development (GSD) movement, spearheaded by TA developers in the U.S. There is, in fact, a Canadian group forming a Special Interest Group (SIG) within STLHE. Librarians are included in this initiative as working group members and as an important support group. GSLI is, however, predominantly a support services initiative of ancillary campus groups (career services, GSA, Learning Commons, Teaching Services Support). The academic and pedagogical basis of graduate student support is still evolving. GSLI is an umbrella group with a shared goal and some collaborative programming and marketing, while still working towards integration within the existing academic community.

The question still pending — and this is one challenge noted in a review of GSLI issues — is “Who owns graduate studies?” With respect to professional skills training, this is an interesting question, challenging the very tight and traditional relationship between students and their faculty supervisors. The horizon expands greatly under newer models and expectations of graduate studies outcomes. Universities have paid scant attention to fostering non-academic skills and competencies, making professionalization education problematic. Academic libraries have also remained wedded to traditional models, and their focus has been on skills that support the academic/disciplinary context. Initiatives such as GSLI are being led by learning support services that have an uneasy relationship within the traditional academic community.

Dalhousie University

The University of Guelph example is one approach, led by Learning Services and Graduate Studies. Dalhousie University has also recently received clear direction from faculty and administration to expand its previous remit to include professional development for graduate students. With this encouragement, Dalhousie's Graduate Studies conducted a series of surveys to explore the development needs of graduate students. Sunny Marche, the Associate Dean of Graduate Studies, reported on the results of the surveys, while also providing a brief background on professional development for both graduate students and postdoctoral fellows, and positing prospective principles and practices. He delivered his report at the 2007 annual CAGS Conference (the Dalhousie research began independently of the Tri-Council research and publication of its statement of principles).

Marche briefly set the context for the research, and succinctly pinpointed salient research in the field. At this stage, it is still assumed that “broadening professional and personal skills development opportunities is the proper responsibility of universities in Canada generally.” Assuming responsibility is, of course, directly related to research on employment destinations for graduate students, faculty demographics, the number of PhDs graduating in relation to tenure-track positions available, and other labour statistics.

Research surrounding the Preparing Future Faculty (PFF) program in the U.S. suggests that research-intensive universities excel at training PHDs to conduct research within relatively narrow domains. Training for teaching and service responsibilities is less laudable — see “What the experiences of today's graduate students reveal about doctoral education” (Golde and Dore 2001). Taking into account the career trajectories of graduate students and Postdoctoral Fellows, PFFs' professional development challenges deepen (realizing that at least 50% of graduates will find employment outside academia, although there is wide variation across disciplines).

Marche concludes his introduction with these comments:

“When we train PhD students for academic positions, we have focused almost entirely on their research competencies, dealing with the teaching component only opportunistically, while ignoring the service and career intelligence components of their futures. For those PhDs and PDFs who will not see an academic career . . . we do not know what competencies they will need to succeed, and if we can help them . . . it is almost certainly accidental.”

The report concludes with the pros and cons of tackling the professional skills development agenda in Canada. Challenges such as scarce resources, no real curriculum initiatives, very few coaching resources, and faculty “poorly prepared to help students identify alternative career approaches or give them much in the way of counsel of how to acquire such jobs and succeed in them” certainly apply to Carleton, with added issues related to the University’s focus on undergraduate education and the predominance of the Master’s-level student within the graduate community. The potential upside of extending training to cover professional skills development might well encourage Canadian taxpayer support, and could positively contribute to the recruitment of graduate students.

International

Canada is coming late to the professional skills discussion. Internationally, the dialogue on research and graduate student training is advanced, as are the incumbent issues and challenges, with the establishment of skills training programs described and debated in reports, in published articles and in conference papers. In fact, assumptions about the role that universities should play in professional development training are being questioned in some quarters, and the nature of “employability discourse” was deconstructed in an interesting article by Gail Craswell of the Australian National University (ANU) in *Higher Education Research and Development* in 2007. Salient points from this discussion include:

- Employability discourse obscures much about skills training, and the supposed skills needs of Higher Degree Research (HDR) students.
- Research training and employability are not mutually exclusive.
- There is nothing new about the diverse career paths of doctoral graduates.
- It is novel to see the deficit model invoked in the context of skills training.
- The notion of an information or knowledge society is now a mega-trend, despite challenges to the incoherence of the ‘concept’.
- The idea of a knowledge-based economy is clearly here to stay.

Innovation is a key driver, with the frequent equation of knowledge-based economies with science in general and/or key knowledge-intensive sectors, such as biotechnology or IT. This often results in a skewing of workplace skills training towards the perceived needs of science students, while the

operational meanings of the knowledge-based economy are still being vigorously negotiated in the literature in the areas in which universities are now offering skills training.

Clearly, there is much to be investigated and discussed pursuant to acting upon recommendations of the Canadian Tri-Council document relating to professional skills for graduate students and new researchers, and the implementation of skills training programs based on the prioritized listing of key skills. Australia has long had skills training programs in place — related to both academia and the workplace in some universities. At a national colloquium in 2005, organized by Flinders University for staff involved in Research Education Development Programs, several issues were raised around the transferability of skills and responsibility for skills training.

The implementation of skills programs also was considered, with emphasis on the diversity of the graduate student population, their possible career destinations, and the different personnel capable of providing training — from educational developers, to faculty supervisors and potential employers. There was also a decided realization that programs were highly institution-specific, that one model does not fit all, and that best practices must be flexibly adapted to specific environments.

Australia — Australia National University

It was clearly determined that, whatever the difficulties inherent in skills training initiatives, “students do value skills training at the institutional level, despite prevailing uncertainty.” Craswell’s review concludes with a brief description of two Australia National University (ANU) programs: part of a university-wide effort to help HDR students gain the skills they need for research candidature, while also acquiring the workplace skills they need or desire. The two programs are the Academic and Professional Skills Program, initiated in 2000 by the ANU Academic Skills and Learning Centre, in collaboration with the ANU Graduate School; and the Graduate Information Literacy Program (GILP), set up in 2001 as part of the Information Literacy Program. GILP is a joint initiative of the Division of Information and the ANU Graduate School. Generic skills training is successfully endorsed in this experience. Embedded programs are another option, but do not discredit the courses offered through specific skills courses and training.

A review of the GLIP initiative at Australia National University is instructive for academic libraries, and is suggestive of the kind of program that can originate within a modern academic library and information environment. GILP is advertised as being “designed to provide postgraduate students with the information searching, information

management and information technology skills that will be needed to complete a graduate degree at the ANU. These skills are sought after in the workplace.” Workshops are offered in data management, bibliographic referencing programs, e-publishing of theses, the Internet and research, the literature review process, and writing, word-processing and software programs for handling scientific documents. These ANU programs aim to provide both disciplinary or academic skills training and “softer skills” training.

GILP is one of a number of ANU programs offering support for graduate research students. The Academic Skills and Learning Centre also offers consultations related to academic skills and learning issues, and workshops providing math and stats assistance and seminar presentations. Professional skills workshops are also offered, communication topics being particularly popular. Additionally, the Department of Computer Science and the ANU Centre for Continuing Education offer specialized and general professional skills courses. The ANU environment brings together academic staff from many university departments or areas to provide a broad base of support. This reiterates the importance of collaboration and co-ordination, and the broad base needed for successful academic and professional skills support.

United Kingdom — New Route PhD

New forms of doctoral education and training are very high on the agenda in the European Higher Education Area, and new degrees are being offered including a Professional Doctorate, the Practice-Based Doctorate and the Taught Doctorate. These innovations in doctoral education programs represent pragmatic and practical solutions to the need to reconceptualize research within the context of emerging knowledge societies and economies, while preparing current students for knowledge-intensive sectors outside of academia. The New Route PhD in the U.K. is one such program. Also called an Integrated Doctorate, it was developed in 2001 by ten British universities, with the purpose of attracting international students. It is now offered by upwards of 30 British universities. The program consists of three integrated elements: a taught component in research methods and subject specialization; another taught component in transferable skills; and a dissertation that can be disciplinary or interdisciplinary. This is similar to a “fast track PhD” offered in Germany, and both basically follow the American model, in which the Master’s level and doctoral level are combined in terms of required course work — although the American model clearly separates the course work and thesis components.

The New Route PhD is only one aspect of a very innovative and supportive environment for graduate students in the U.K. The evolution of the UK GRAD program through the U.K.’s seven Research Councils is instructive.

UK GRAD is now incorporated into Vitae (<http://www.vitae.ac.uk/>): “a national organization championing the personal, professional and career development of doctoral researchers and research staff in higher education institutions and research institutes.” Vitae builds on the work and activities of the UK GRAD Program for postgraduate researchers, and the UK Higher Education Researcher Development (UKHERD) network for research staff. It is funded by the Research Careers and Diversity Unit of the Research Councils UK (RCUK), through a contractual arrangement awarded through 2012. The Career Development Organization (CRAC) — an independent national organization dedicated to supporting career development and active career-related learning — is the contract holder, and hosts the central team for the program. A major key to realizing its stated aims and objectives in national policy, resource-sharing, provision of training and evidence-based development for the research-support agenda is the unified organizational infrastructure that runs from the British government’s objectives for science and innovation through the Research Councils and beyond, to Vitae partners and regional hubs.

The 2004 *Joint Statement of the UK Research Councils’ Training Requirements for Research Students* (see Appendix F) sets standards and “identifies skills that doctoral research students funded by the Research Councils would be expected to develop during their research training.” The purpose of the statement is to provide a common view of the skills and experience of a typical research student, thereby providing universities with a clear and consistent message aimed at helping them to ensure that all research training was of the highest standard, across all disciplines. Canada’s Tri-Council, CAGS, STLHE statement of principles on key professional skills for graduate students and new researchers sets out a similar agenda with reference to professional skills. To date, however, there is no clear vision or infrastructure of national scope to implement research training and support programs as evidenced in the U.K.

King’s College

To understand the impact of the British government’s Roberts Agenda (*Set for Success*) and the Joint Statement of the RCUK on the university community’s research education development mandate, the example of King’s College, London is instructive. In 2005, the College’s Graduate School was established to enhance the graduate student experience and to maximize student potential. The School was given responsibility for delivering training to postgraduate students and research students to meet the Roberts Agenda (Appendix G), which requires that every postgraduate student receive the equivalent of ten days’ training in generic and transferable skills per annum. This involved a comprehensive reorganization in the delivery of generic and transferable skills within the College. A Training Course administrator was hired, and a team of four

was assembled to implement the program in consultation with, and with support from, graduate administrators of individual schools and departments. Funding for training comes from the Roberts program, and this has allowed for the building of a graduate training room and the purchase of software (SkillsForge) for online booking, training needs analysis and the development of a personal log.

The Graduate School provided an extended Induction Day in October 2008 aimed at offering more effective school induction liaison, and in 2007–2008 over 100 training courses were offered. In addition, a writing fellow was secured through an agreement with the Royal Literary Fund to provide thesis-writing consultation for graduate students, and two Roberts open funding competitions were instituted for training initiatives by researchers, schools, etc. In 2008–2009, the new Researcher Development Program was announced, with the publication of a handbook of combined training and development opportunities for both research students and research staff. Courses are offered in the areas of personal, professional and career skills. The courses are primarily focused around transferable and generic skills, but PhD process courses are also offered, and students and staff are encouraged to take advantage of subject-specific training offered by individual schools. Additional training opportunities are listed at the end of the handbook, including a brief description of IT and iSkills workshops offered by the Information Services and Systems (ISS) department of King's College.

Interestingly, this King's College Researcher Educational Development undertaking drew, no doubt, on the experience of the ISS iGrad program, which was developed to meet the IT and Information needs of graduate students in the Health Sciences. Margaret Haines — now Chief Librarian at Carleton University Library, and formerly director of the ISS unit of King's College — and Gary Horrocks reported on this then-pilot program at the 70th IFLA General Conference and Council in Buenos Aires in 2004. The iGrad program covered the cycle of information literacy from approaching the research project, through review of literature and the use of tools such as Word, PowerPoint and bibliographic management software. The program also offered courses on basic and advanced Medline searching, and statistical methods and packages. This experience, including challenges around assessment and an analysis of training needs, was part of the experience and knowledge base that informed the College's Human Resources Strategy and the Advisory Group on Researcher Development, leading up to the present Researcher Educational Development Program.

CARLETON UNIVERSITY LIBRARY = STRATEGIES FOR THE FUTURE?

Turning back to Canada and the Tri-Council Statement of Principles on Key Professional Skills, in terms of the as-yet-undefined role of the three research funding councils and the graduate studies programs and faculties of Canadian universities it is an enormous challenge to approximate the unified response from government, funding councils, national organizations, universities and other stakeholders as seen in the U.K. example. Carleton University continues its efforts to establish its reputation as a research-intensive university — it does this, however, in the midst of economic stringency, and without the external funding resources and partnerships that could allow for the development of integrated skills training programs. From the perspective of academic libraries, both at Carleton and across Canada, the prominence of the Information (Library) Services sector at King's College over the past decade, in the planning and implementation of skills training at the University-wide level, is encouraging and empowering. Research skills, together with training in writing skills, have always constituted an important part of graduate student support within Canadian universities, including Carleton. The Carleton University Library — with its extensive experience delivering information literacy training through consultations, orientation sessions, and in class workshops — is legitimately positioned to contribute to the development of training support for graduate students.

In order to effectively contribute — and, in fact, to provide leadership in this area — academic libraries, while continuing to provide traditional training in information skills, must move towards a specialized, integrated service informed by co-ordinated and collaborative partnerships within the library, the library community at large and the university environment. Because the research needs of graduate students are unique, and because there does seem to be a skills gap in personal, research and professional areas, meeting those needs effectively requires a rethinking of how libraries — and, for the purposes of this report, Carleton University Library in particular — function. The appointment of a Graduate Research co-ordinator and a Graduate Services team could provide the organizational infrastructure to:

- Provide library team support for research, discussion and programming, in areas related to generic skills training for library public services staff.
- Conduct research — particularly qualitative studies — to investigate the needs of local graduate students and to provide feedback on innovative teaching methods.

- Become involved in higher education research — conducting, discussing and reporting on results of such research for library stakeholders.
- Institute regular meetings of library staff, organized around best practices, pedagogical issues and support for graduate research workshops.
- Liaise with other academic libraries to share knowledge and expertise. This could be greatly facilitated by the encouragement of formal work exchanges, locally, nationally and internationally.
- Investigate the feasibility of the employment of a “research scholar” to contribute to the understanding of critical issues related to research training in a knowledge-driven economy.
- Evaluate the programs and teaching as currently practiced; investigate methods for extending research skills training in the context of transferable skills.
- Meet with, provide support for, and develop graduate skills training programs in conjunction with Grad Studies. This could include a joint orientation program for new graduate students and a joint colloquium at which graduate students could report on their research projects.
- Report regularly on issues of importance and debate within the Carleton University community related to graduate study and research.

There are examples of programs in research-intensive universities worldwide that have bridged the divide between research-intensive skills training and professional skills development. A report on the development of a research student portfolio process (RSVP) at the University of Queensland in Australia is an excellent example of an attempt at bridging the different practical, pedagogical and philosophical training agendas. Within the traditional context of graduate student/graduate supervisor research education, there are opportunities for other academic partners to creatively engage in the process of encouraging, identifying and designing projects and activities which would allow current students to understand and articulate their research skills as transferable and professional skills beyond the confines of the academic experience.

There is an undeniable global trend to provide for more focused attention to graduate studies and research by higher education administrators and educators. Universities that have opted to re-organize traditional departmental structures, in order to plan for and accommodate the needs of

graduate education, are better able to investigate, co-ordinate and implement programs and services which will advance the scholarly commitment and reputation of their library and the larger institution. There is a recognition by these institutions that graduate education in support of research, teaching and learning requires a long-term commitment to lay the foundation for an evolving higher education environment through creative use of space, both physical and digital, to orient philosophically and pedagogically to accommodate public, government and employer demands for accountability, and to address the challenges of interdisciplinarity, globalization, and collaboration.

Carleton University Library could provide leadership for the research aims of the University if it would assume a dynamic, proactive role in this direction. The existence of a Graduate Research team or committee with an appointed co-ordinator would enable the Library to foster a defined scholarly environment that would be supportive of graduate students, faculty and library staff interested in following research paths. Additional benefits that would accrue from such an organizational structuring include:

- More specialized co-ordination of services that are currently dispersed, thus encouraging better integration of Interlibrary Loans staff in collections discussions, while bringing to the foreground areas such as Archives and Research Collections.
- Creation of a natural forum for the discussion of space, technology and other access options in support of, for example, increased interdisciplinarity, and media support services.
- Encourage more effective program planning and marketing in support of research and professional skills development at a broad, institutional level.
- Investigate partnering options, and look to involve the Library in research endeavours on campus.
- Encourage the setting of a research agenda for librarians and other staff that would support the educational, research interests of the Library and provide options for sabbatical projects, research leaves, etc.

There are a number of important bodies on campus that have direct responsibility for, and impact on, graduate studies and education, and the recruitment, retention and support of graduate students. These include: Graduate Studies and Research, the Office of Research and International, the Graduate Faculty Board and the Graduate Students Association, along with the faculty and administrative staff of individual faculties and departments. Graduate Studies and Research and the Office of Research

and International are actively involved in strategic planning and on-going evaluation of strategic objectives. Library staff generally should be aware of these objectives, and should actively investigate programs and services that would support the strategic goals.

In the March 2009 review of its strategic *Vision 2014* document, the Graduate Studies and Research unit at Carleton emphasized the need to take a leadership role in facilitating an integrated intellectual community at the University. Specific imperatives included:

- increasing research productivity;
- increasing the number of doctoral students;
- increasing the effectiveness of the graduate student support budget as a recruitment tool;
- employing more effective recruitment strategies; and
- supporting the Vice-President, Research and International.

The draft *Carleton University Research Plan, January 2009*, (<http://research.carleton.ca/docs/ResearchPlan09.pdf>) declared Carleton's strategic direction to be advancing "an internationally recognized community of scholars committed to discovery, knowledge transfer, student engagement and community service." In support of this overarching goal, two main strategies are indicated: 1) accelerating Carleton's standing as a research intensive university; and 2) defining and developing Carleton's distinctive identity as a research institution. In support of these strategies, the Plan points to specific features that Carleton can use to build upon — one prominent characteristic being the moderate size of the institution that allows for "flexibility and openness to be innovative and creative in its ability to address cultural, social, international and environmental issues." In addition, the Plan states that, "Carleton will be known as an institution where both the single scholar model and innovative, interdisciplinary approaches to research can thrive."

The Library can note, in particular, strategies to "increase the organization of space to maximize the University's ability to facilitate interdisciplinarity," and "to establish formal and informal means for faculty, grad students and post doctoral students to communicate with one another across disciplinary lines." The Library should also be encouraged and energized by the stated objective of "an increase in the number of outstanding graduate students attracted to Carleton and *the capacity to provide these students with an enriched academic experience that ensures their competitive marketability after graduation.*"

PARTNERSHIP: COLLABORATION, COORDINATION, INTEGRATION

The success of initiatives to support graduate education and research are greatly dependent upon collaboration and co-ordination amongst key sectors within the university community. The Office of Research and International and Graduate Studies and Research at Carleton set an agenda and developed strategic plans that will hopefully stimulate integration and co-operation within the academic community. The University's Graduate Students Association (GSA) recently participated in a Faculty of Graduate Studies and Research task force and pilot project on TA training, performance and other issues. GSA is a key link to the graduate student environment, and its help is invaluable in communicating graduate student needs and concerns. Carleton's Library has also participated in the TA pilot program, and is poised to continue working with the GSA executive on matters of common concern. Surveys and focus group sessions to assess the effectiveness of library support are the areas in which GSA collaboration would be most effective.

Partnerships within the academic community would be greatly facilitated by the Library's continuing and expanding efforts to show understanding of, to show support for, and to develop programs, which would advance the key strategic goals of graduate studies and education, as outlined and presented in key strategic planning documents. The Library could establish a review process that allows for measurement and reporting of library initiatives against strategic priorities and stated desirable outcomes and that would, most importantly, enable the Library to make suggestions for collaborative endeavours in support of graduate recruitment and retention.

One possible partnering with the Faculty of Graduate Studies and Research could feature joint hosting of a yearly conference/colloquium event that would showcase graduate student research in progress. The 2009 Congress of the Humanities and Social Sciences, hosted by Carleton University, provided an excellent opportunity for graduate student presentations. Carleton's *Research Works* publication highlighted some of these research stories, and the Dean of the Faculty of Graduate Studies and Research added an enthusiastic endorsement of all the graduate student presentations, and "the depth of knowledge and fresh perspectives that graduate students bring to intellectual debate."

For graduate students to develop not only their research skills, but also various professional skills, a holistic approach is necessary for ultimate success. Consultation and co-ordination with faculty at departmental or faculty levels would contribute to enhancement of library workshops in the areas of interdisciplinarity, problem-based learning and skills transferability. Working in tandem with GSA members would enhance the

marketability and appeal of library programs and services and lead to innovative practices based on ongoing needs assessments.

The integration of professional skills development within an academic context will need co-operation and collaboration at broader levels than currently exist, either campus-wide, or indeed within the Library itself. A dedicated forum within the Library to investigate the options for graduate instructional support, and to co-ordinate on-going program research, implementation and evaluation would help to lay a foundation and provide direction for successful, systemic partnerships and collaboration within the University.

Two important questions that library staff need to address with respect to the broad topic of graduate student research skills and professional skills training are:

- Are there workshop topics that have a broad appeal, which would benefit students from across the spectrum of disciplines — and, if there are, how best to proceed in terms of planning, marketing and establishing measurable outcomes for general skills workshops?
- If Carleton's Library agrees to the idea of professional skills training in principle, are there innovative ways in which to integrate and extend traditional information literacy skills to enable transferability and professionalization? What organizational structure best suits professional skills training?
- How can the Library help to create a nexus for graduate researcher development within the Carleton academic and learning support community?

* * *

It was noted earlier in this report that the Graduate Student Learning Initiative (GSLI) developed at the University of Guelph is under the direction of the Learning Services Co-ordinator. While there have been many advances in collaboration with centralized scheduling and marketing of programs and workshops at Guelph as a result of this collective of learning support groups, significant issues, challenges and areas for future development remain, if political, strategic and philosophical/pedagogical questions are to be adequately addressed. Learning Support Services at Carleton, brought together during planning for the Learning Commons initiative in 2005, are focused on undergraduate support for study skills, time management and essay writing, generally. Graduate education matters whether curricular in nature, relating to research skills training, or to professional concerns remains within the purview and responsibility of individual departments, their faculty advisors and teachers, managed and

supported by the Faculty of Graduate Studies and Research and governed by decisions of Graduate Faculty Board. To effectively address ideas, plans and programs for the enhancement of graduate education through research skills workshops, aids to timely progression to degree completion and professional skills development for both academic and non-academic careers, the academic community at Carleton must accommodate to a now global imperative to create an integrated, community wide response to program development in support of an enhanced graduate education environment.

One significant recent example of collaboration at Carleton in this regard is the development of a TA Mentoring Program, spearheaded by the Faculty of Graduate Studies and Research, in collaboration with the Educational Development Centre (EDC) and the GSA. The program (offered through the EDC) offers two TA certificates, outstanding TA awards, a program of workshops, a newsletter and handbook. Now in its second year, the program employs experienced TAs from eleven participating departments, who act as mentors, passing on their knowledge, skills and professionalism to new TAs.

This type of program and collaboration taps into the many currents evolving worldwide within the graduate education environment, such as Graduate Student Development (GSD), spearheaded by TA developers in the U.S., and the Preparing Future Faculty (PFF) initiative (DeNieef, Association of American Colleges, 2002). The Library enthusiastically participated in the Task Force set up to investigate TA issues and challenges, and helped to provide research skills orientation tips to this year's TA mentors. Ongoing monitoring of programs and initiatives associated with this kind of research and professional skill development will provide encouragement for faculty and librarians to understand research and information literacy skills in the wider context of professional skills requirements and to work together to integrate skill development within substantive research arenas.

Further forward movement in the creation of a strong research support network that is co-ordinated campus-wide, informed and in touch with the needs of graduate students and the perspectives of graduate faculty supervisors — and cognizant of external local and worldwide issues, challenges and evolving programs — depends on the continued exploration and articulation of academic and professionalization agendas by key participants. The Library will be in a strong position with continued evolution internally and externally within the academic community at large. A strong voice on the Graduate Faculty Board and on other University committees, combined with continued organizational and program evaluation, will help to position the Library at the centre of graduate researcher development.

Appendix A

CANADIAN ASSOCIATION FOR GRADUATE STUDIES PROFESSIONAL SKILLS DEVELOPMENT FOR GRADUATE STUDENTS

The Canadian Association for Graduate Studies (CAGS) focuses on issues related to graduate students and postdoctoral fellows. In 2008, the Association concentrated on issues related postdoctoral fellowships and professional skills for graduate students. The following document was published by CAGS in November 2008.

Executive Summary

Professional skills development for graduate students has been a topic of discussion among university graduate communities and members of the Canadian Association of Graduate Studies in particular. The phrase “professional skills” is used in the broad sense to describe skills that complement the disciplinary knowledge and disciplinary technical skills that remain the most important aspects of any graduate training. By skills we mean behaviors that can be learned, that can be improved with practice, that require reflection, and that benefit from ongoing coaching.

There is no doubt that there already exists considerable expertise and opportunities for professional skills development across universities. Of course there are variations in how, what, or how much is available and there are very few, if any, institutions which have the resources to provide complete coverage of these skills to their students. In this report we seek to identify a core set of such skills to base a national inventory from which gaps and best practices can be identified, so that we can plan collectively to provide broad access to a core for all graduate students.

The objective of this document is to provide a springboard for the CAGS community to engage actively in this discussion, to develop a consensus on need for the further development of these programs, and potentially to propose a plan for action to explore how to provide a core set of skills across all institutions.

In the summer of 2007, a joint Tri-Council, STLHE, CAGS workshop kick started the discussion of professional development for new researchers. From this initiative, we have identified four areas of focus by consolidating ideas and striving for wide applicability. The broad areas are communication, management, teaching, and ethics in research.

Finally, in the Canadian context and with the reality of resource limitations at all academic institutions, it is clear that success going forward will be achieved only by capitalizing on current programs and current expertise as we identify priorities and gaps.

I. Introduction

The Government of Canada has articulated the need to strengthen Canada's people advantage so that Canada can attract and retain the highly skilled people needed to thrive in a knowledge-based economy and to make meaningful contributions to society, both nationally and internationally. Increasingly, funding agencies, universities, employers of highly qualified people, researchers, and graduates themselves recognize the importance of professional skills that complement their disciplinary expertise. To be competitive then, graduate students increasingly need to engage in ongoing development of their skills in areas that complement their academic programs and enhance their employability. The knowledge economy demands a high level of professional skills from all of its participants if they are going to increase the economic and social benefits for Canadians and for society in general. These new expectations are *complementary* to not *instead of* academic credentials. In 1998 Oblinger and Vervilleⁱ made an observation still relevant today: "The problem is not that today's graduates are less skilled than those of previous generations, but that expectations for performance are much higher today than ever before."¹ Canadian graduate programs provide many opportunities for skills development but this aspect of graduate education has only recently been emphasized. Effective professional skills development provides our students with opportunities to reflect on and extend their expert knowledge and experience as they develop individual careers. Universities across the country recognize this and have risen to the challenge within the limits of their resources and expertise. The goal of this document is to begin a dialogue related to such skills so that institutions, departments, and individuals can identify gaps in their own offerings and so that as a community we can identify opportunities for filling the gaps. The long term vision is to provide a network of programs across the country so that all graduate students can develop these skills.

The following discussion is based on the premise that disciplinary knowledge and technical skills remain the most important aspects of any graduate training delivered at a university. By skills we mean behaviors that can be learned, that can be improved with practice, that require reflection, and that benefit from ongoing improvement. The phrase professional skills is used here in the broad sense to describe skills that are complementary to disciplinary knowledge and that will enhance the graduate's ability to be successful in the transition from academic to work life.

Just as there are differences in academic expectations from masters to PhD

programs, there are different expectations for professional skills for different career contexts, from the private sector to academia, to the government and public sectors, and to not-for-profit organizations. Initially, at least, we will concentrate on areas that have broad application. While universities are clearly responsible for the discipline-specific skills, they have become more involved in the broader skill development, whether this development is overt and intentional or not. Currently, many of the resources, courses, and programs mentioned in this report already exist in pockets within university communities. By taking a more structured approach in the area of professional skills, universities can enhance their ability to help their graduate students achieve a higher level of competitive expertise.

The discussion is presented in the following sequence. First we present broad principles to frame choices and priorities. Second we propose a small core of professional skills that should be available to all graduate students, either in local or remote fashion.

Finally, we consider how to move the agenda forward.

1. The university is responsible for providing graduate students with the best possible preparation for their future roles whether within academia or in other sectors. This responsibility extends to developing professional skills.
2. Professional skills development will be more successful and more efficient if it is formally recognized by the institution.
3. Professional skills components should not extend the length of the program of study.
4. Expectations for developing specific professional skills should be appropriate to the needs of different student communities, according to discipline and program, taking into account level of study (Masters/PhD), and considering the long-term goals of the student (i.e., academic/public sector/private sector/not-for-profit sector).
5. The university should have the willingness and be provided with the resources to invest in the capacity for developing such skills.
6. Programs for developing professional skills should be experiential and open ended in nature.
7. Academic programs and university resources continue to be responsible for the development of necessary academic skills including critical thinking and academic communication skills related to writing and

presentation, in particular.

Target Audience

The target audience for professional skills development includes all graduate students and includes the range of different career paths they may follow whether in the academic, private, public, or not-for-profit sectors.

II. Establishing Priorities

Criteria for Selecting Professional Skills Areas for National Inventory

1. These skills must have a demonstrable high impact for a broad range of graduate students.
2. These skills must have a high potential for successful development and delivery in the university context. That is, we must be able to define specific components and students need to be able to show that competency has been achieved to a minimum standard, i.e., competency must be measurable.
3. Students must be able to develop competency in these skills in a reasonable timeframe during their graduate programs. Specifically, the student's progress to degree cannot be delayed or compromised by additional non-academic requirements or opportunities.
4. Skills that are necessary for the achievement of academic success should be integrated into academic programs and supplementary services rather than depending on separate professional skills programs.

Identifying Professional Skills Areas

As a starting point we considered the list of nine areas for professional skills development proposed by the TriCouncil/STLHE/CAGS workshop in 2007:

- Communication and interpersonal skills
- Critical and creative thinking
- Personal effectiveness
- Integrity and ethical conduct
- Teaching competence
- Leadership
- Research management
- Knowledge mobilization and knowledge translation

- Societal/civic responsibilities.

From this list we propose a shorter set of skills areas for our purposes that have high likelihood of success in implementation in the university context. The four areas we propose are: communication, management, teaching, and ethics. These four areas contain many, but not all, of the concepts spread across the nine and meet our stated criteria related to potential for implementation. This is not to downplay the other topics but as a practical matter to focus our attention on what is most doable going forward. Many universities, of course, already provide programs specifically for some or all of these skills. Almost every Canadian university, for example, provides training and support for developing teaching and pedagogy skills.

1. Communication Skills

All graduates need to be able to communicate effectively, concisely, and correctly in written, spoken, and visual forms to a variety of audiences using a wide range of media. Communication includes the effective sharing of knowledge and expertise in a variety of situations (to peers, to the general public, and to decision makers). Graduates need to be confident in giving oral presentations at team meetings, seminars, and conferences just as they need expertise in the preparation of scholarship proposals and grant proposals for submission to external funding agencies.

2. Management Skills

Management skills include knowing how to manage people and constrained resources successfully in research settings including the setting of research goals and milestones, preparation and management of budgets, and even contract negotiation. Graduate students need opportunities to develop suitable organizational skills and appropriate knowledge of financial management, people management, and project management. These skills will allow them to work efficiently in a wide range of situations involving projects with different objectives, different timelines, and different stakeholders.

3. Teaching and Knowledge Transfer Skills

Graduates are expected to be able to explain complex concepts related to the content, skills, and processes of their discipline in various workplace contexts. Graduate students planning on a variety of careers need experience in identifying the learning outcomes as well as in selecting appropriate content and delivery models. They also need experience adapting their instructional, outreach, and dissemination activities for different contexts to address different learning styles, motivations, backgrounds, and experiences.

4. Ethics

Graduate students need to acquire skills to assist them in making sound judgements based on an accurate grasp of basic ethical principles. Researchers at all levels must be aware of and adhere to professional codes of conduct and standards in and beyond their disciplines. Graduates need comprehensive information about and experience in ethical considerations in situations involving conflict of interest, authorship, and intellectual property attributions, especially in multidisciplinary and multicultural situations, taking into account social and environmental considerations.

III. Operationalizing: Moving the Agenda Forward

The data from students, alumni, post-doctoral fellows, junior faculty, and employers strongly supports the current approach that Canadian universities are taking to provide skills development among graduate students. This presents us, as a community, with opportunities and challenges. The benefits to graduate students are many: increased confidence in approaching their first job,² personal reflection on managing the academic to work life transition, and engagement in a process of self-motivated learning of professional skills.

Challenges to the universities include:

- Avoiding extending the length of graduate programs,
- Being explicit in the learning objectives and expectations,
- Balancing voluntary with compulsory programs,
- Identifying the unit or units on campus responsible for development and delivery of programs,
- Finding the necessary resources.

Moving Forward

To move forward we suggest that CAGS take a leadership role to:

1. Create an up-to-date inventory of resources, practices, and methods at the individual university level, including programs delivered by professional faculties, such as business, education, and health professions.
2. Identify gaps in coverage and barriers to success.
3. Develop a comprehensive and detailed description of specific core skills and competencies in those areas, taking advantage as much as possible of existing literature and best practices.
4. Decide how best to deliver core skills nationally in a comprehensive

manner taking into account resource considerations.

Summary

The expectations on our graduates are beginning to shift, with a greater emphasis on developing the graduates both personally and professionally to support their individual academic to work- life transition, whether the profession of choice is going to be in the private sector, the public sector, or not-for-profit sectors. Ultimately, each university makes the final determination, within its own context, of how to select, resource, and implement the development and delivery of individual professional skills programs. The goal of this discussion paper is to begin the process of understanding the current landscape of professional skills programs in Canadian universities, to identify a small core of areas of common interest, to identify gaps in the current delivery of such programs, and to begin to develop a national strategy for ensuring that all graduate students have access to at least a core set of programs.

¹ Oblinger, D.C. and A.L. Verville, 1998. *What Business Wants from Higher Education*. American Council on Education /ORYX, Phoenix, USA.

² Jaschik, Scott. 2008. Confidence Gap for New Profs. Inside Higher Ed. July 11. [www.insidehighered.com]

Appendix B

ACRL RESEARCH AGENDA FOR LIBRARY INSTRUCTION AND INFORMATION LITERACY

The Research and Scholarship Committee of the ACRL's Instruction Section published a Research Agenda for Library Instruction in 2000 (an updated version of the 1980 Agenda). The document covers four main areas: Learning, Teaching, Organizational Context and Assessment. The document's strategic priorities are reproduced below.

In the April 1980 issue of C&RL News, the ACRL Bibliographic Instruction Section (BIS) Research Committee published the Research Agenda for Bibliographic Instruction. The Research Agenda outlined important research questions related to instruction programs in academic libraries, with the hope that research would inform decisions about effective approaches for providing, managing, and evaluating classes and programs. Since its release twenty years ago, many aspects of the instructional environment have changed including identification of new user populations, development of increasingly networked technologies, reorganization of campus agencies, increased emphasis on academic accountability, and an evolving educational role for libraries and librarians.

Charged with updating the document in 2000, the ACRL Instruction Section (IS) Research and Scholarship Committee reviewed research articles formally published in the United States, and gathered input from national conferences to identify important research areas relevant to academic library instruction programs in the current environment. While many of the original issues still lacked substantial research, new themes also arose. Similarly, the scope of the document was expanded to include an emphasis on information literacy, reflecting the transition that our institutions and organizations are experiencing.

The Research Agenda for Library Instruction and Information Literacy is organized into four main sections: Learners, Teaching, Organizational Context, and Assessment. Each section poses general questions with the goal of encouraging those interested - practitioners, researchers, and students alike - to conduct research around these important areas. Many studies published since the previous Research Agenda have focused on a specific environment, situation or audience, making it difficult to generalize the conclusions for other contexts. It is hoped that this Research Agenda will encourage researchers to experiment with a range of research methods, to revisit issues and focus on different variables, and to collaborate among institutions so that results are meaningful for wider

audiences. Additional details may be found in the Committee Publications Details & Revisions Schedule (pdf).

I. Learners

Academic library users represent diverse ages, ethnicities, and abilities. Information seeking behaviors, technological competencies, and research skills vary widely among learners, presenting a challenge for librarians. By understanding more about these audiences, instruction librarians can create meaningful educational environments and enduring library instruction programs that meet an individual's current and future needs as a student and lifelong learner.

A. Audiences

Over the past twenty years formal and informal library instruction has evolved to include many groups previously underserved or unacknowledged. These populations include groups such as: at-risk students, English-as-a-second-language (ESL) and international students, students with disabilities, returning adult students, off-campus and distance education students, high school groups, part-time and adjunct faculty, graduate and teaching assistants, campus staff, and administrators. Each of these audiences presents unique issues for library instruction and information literacy programs.

1. How has the emergence of new campus audiences had an impact on academic library instruction?
2. How can instruction best adapt to changes in the characteristics of the audiences?
3. What issues should librarians be aware of for marketing and promoting to these groups?
4. How might the type and timing of instruction be best tailored to each audience?

B. Skills

In order to use electronic information resources efficiently, scholars must sharpen their computer literacy and information literacy skills. Since many students turn to the Internet as their primary tool for research, they need technological competencies and an increased sophistication in the selection of the materials, perhaps even more so than in the past. Critical evaluation, ethical use of online content, and focus on the new technologies themselves

have become important facets for inclusion in instruction programs for students and faculty alike.

1. How have information-seeking behaviors of library users changed?
2. How has use of the Web changed perceptions and use of the library?
3. How is technology altering the need for certain types of skills?
4. What impact does the relationship between students' actual and perceived library and research skill levels have on their information-seeking behaviors?

C. Learning Styles

Tailoring library instruction sessions to accommodate various learning styles — such as visual, auditory and kinesthetic — has gained prominence in the past few decades. Discerning how different learners will learn most effectively, how to balance the variety of styles preferred in one class, and how to adapt to these learning styles in both traditional and online learning environments requires special attention.

1. How effective are different methods of instruction for addressing various learning styles?
2. What characteristics of learning environments positively impact the experiences of people with each of the various learning styles?
3. What impact do different learning styles have on the effectiveness of various teaching methodologies?
4. What impact does the Internet, as a teaching tool, have on learning styles, and what are the implications for library instruction?

II. Teaching

As with all instruction, library instruction and information literacy can be informed by a variety of pedagogical theories and techniques. The design and implementation of a library class or course will be driven largely by the teaching methodology the instructor adopts. Methods, such as problem-based learning, collaborative learning and hands-on learning; tools, such as presentation software or electronic classrooms; and the nature of the class, such as credit, non-credit, course-integrated, or optional, all affect the impact of the instruction given. Maintaining the skill sets to address all of these issues relates to ongoing questions about professional development for those teaching research and information literacy skills.

A. Pedagogy

Library instruction has foundations in educational pedagogies including liberal, traditional, behavioral, progressive, and radical. Simultaneously, the pedagogy of library instruction is furthered by its engagement with disciplines - such as cognitive science, information architecture and design, and human-computer interaction - and concepts such as action research, distance education, home-schooling, learning communities, and multiculturalism. There is a continuing need for research into the pedagogical basis of library instruction, and the application of educational theories and methodologies to actual library instruction.

1. Has library instruction developed its own theoretical basis and methodologies? If not, should it?
2. What is the scholarship of teaching and what has been its impact on library instruction?
3. How has the pedagogy of library instruction been affected by the emergence of such concepts and disciplines as listed above?
4. Is library instruction an appropriate setting for teaching critical thinking skills and evaluation of information? If so, what are the best ways to approach these concepts?

B. Design and Implementation

Traditional library instruction classes are developed based on many factors, including varying characteristics of the audience and assignments, course nature and curricula, classroom settings, availability of instructional tools, and faculty needs. Development of information literacy courses or components involves a more holistic approach to determining the educational needs of students as they progress through their academic lives, as well as collaboration with other librarians and educators.

1. What are effective models of library instruction for general versus subject-specific courses?
2. How does the structure and delivery of instruction differ when organized according to goals or concepts such as lifelong learning, subject-based teaching, course-integrated instruction, course-related instruction, or credit-bearing library courses?
3. To what extent can instructional projects created to serve one audience be effectively adapted to serve others, such as a program designed for distance education students adapted for the general campus user population or vice-versa?

4. Can effective, scalable instruction be developed for institutions of all sizes?

C. Methods of Instruction

Educational techniques — such as tours and demonstrations, active learning, problem-based learning, social or community-based learning, self-directed or independent learning, and action learning — can all be adapted for the range of traditional, electronic, and virtual learning environments. In each environment, it is important to consider what array of approaches to instruction — such as formalized classes during the course time, voluntary-attendance workshops, online assistance, and one-on-one consultations — provide the most effective support for learners. Approaches for the development of effective library assignments, resources, and tutorials in print and online deserves more concentrated research.

1. Can traditional teaching methods be successfully applied to Web-based instruction?
2. How effective is online instruction as compared to more traditional instruction methods?
3. Are problem-based assignments more effective than library-created assignments?
4. How effective are stand-alone assignments compared to course-integrated assignments?
5. How can assignments effectively integrate print and digital information sources?
6. What is the relationship between effective instruction and the timing of assignments?
7. How effective are different types of delivery methods for course-related instruction?
8. How can libraries effectively build upon the relationships between formal library instruction, one-on-one consultations, and integrated information literacy skills?

D. Library Teaching and Continuing Education

Recognition of the need for ongoing education for librarians providing instruction has grown significantly in recent years. Various models

currently exist within the profession for developing instruction skills including library school courses, continuing education programs, workshops, seminars, conferences, institutes, computer-based instruction, and texts; however research could determine the need for and impact of directing additional resources towards developing librarians' instructional techniques and expertise.

1. What are the most effective ways for a librarian, who has previously done little or no teaching, to learn fundamental methodologies and pedagogies?
2. What educational skills from other teaching professions are relevant for librarians?
3. How can an institution ensure that librarians participating in information literacy efforts have the knowledge and skills to make the program successful?
4. What impact does assessment of instruction, such as teaching portfolios or peer observation, have in the promotion and tenure process?

III. Organizational Context

Library instruction exists both as a function within the library and as a part of the overall mission of the university, college, or educational institution. Library instruction and information literacy programs can be organized and managed according to different models, influenced by the internal structure of the library. The success of information literacy and library instruction initiatives is also highly dependent on the larger institutional environment. Factors such as the level of cooperation between academic departments, the perception of librarians as teachers and faculty colleagues, and expectations for the library determine how these programs are implemented and sustained.

A. Relationship within the Library Organizational Structure

The organizational structure of information literacy or library instruction programs varies from library to library. Some examples of specific organizational models include a separate instruction unit or department with librarians assigned to it, team coordination of instruction, an instruction coordinator who does not supervise librarians directly, and instruction duties merged with reference or subject responsibilities. Organizational differences determine instruction librarians' responsibilities within the library, with academic departments, and elsewhere in the institution. Questions remain about the benefits and drawbacks of different organizational models.

1. What impact do different organizational models have on library instruction?
2. How does instruction as a function overlap with, and what is its impact on, other services in the library such as reference, distance education, and web development?
3. What professional roles and responsibilities would enhance the ability of librarians to provide high quality instruction?
4. Is it more effective for generalists, subject specialists, or a combination of the two at different levels to teach information literacy and library instruction?
5. What incentives support the development and delivery of high-quality library instruction?

B. Relationship to the Larger Institutional Environment

To formulate an effective instruction program, it is necessary to understand and work effectively with administrators, faculty, staff, students, alumni, and community patrons. Familiarity with departments and campus organizations similarly concerned with student educational outcomes - such as faculty teaching centers, writing centers, and evaluation agencies - and participation in campus-wide planning offer possibilities for new partnerships. Issues such as faculty status of librarians, promotion and tenure guidelines, and institutional governance are important factors to consider when implementing changes in existing instructional programs or developing new ones.

1. What university characteristics--academic, administrative, or cultural--lead to an environment supportive of library instruction?
2. How does the perception of the librarian's status and role in a student's education affect the success of library instruction initiatives?
3. Do campus-wide information literacy requirements facilitate quality library instruction programs and if so, how?
4. How can we identify and work with courses, academic departments, and other offices providing student and faculty support to ensure that library instruction has a broad impact?

5. How can standards for information literacy be coordinated with and complement other professional organization standards, subject-area standards, K-12 standards, or other model academic standards?

C. Relationship with Faculty

A primary goal of many library instruction programs is to support the courses and curricula of the institution. As an increasing focus is placed on sustaining information literacy programs, coordination with the faculty responsible for planning and offering the courses becomes essential. Whether promoting a library instruction program, consulting about assignments, or team-teaching a course, relationships with faculty members on an individual and departmental level become preeminent.

1. What techniques are effective for promoting course-related instruction services to faculty?
2. How can librarians and teaching faculty partner to ensure that students gain information literacy skills?
3. What are the benefits and drawbacks of team teaching with faculty?
4. To what extent are non-library faculty receptive to collaboration with librarians, and what factors influence receptivity?
5. What are the characteristics of effective research instruction conducted by teaching faculty, teaching assistants, or other non-librarians?
6. Do the different ways in which librarians and teaching faculty perceive research have an effect on how students learn research skills?

IV. Assessment

Assessment and evaluation are essential parts of documenting the effects of library instruction and information literacy programs. Future research in the areas of assessment, evaluation, and transferability needs to address involvement from stakeholders other than librarians, and include an integration of discipline-based standards or model academic standards. Information literacy programs need to show that skills learned are transferable from one discipline to another and from secondary school to higher education and beyond.

A. Evaluation of Instructors and Programs

Evaluation of instruction and information literacy programs is a key component in determining the value of programs, activities, and techniques

within the educational process and to determine areas needing attention. Administrators are demanding justification for programs through cost-benefit analyses of programs and activities, and requiring evidence of successful learning outcomes.

1. What are the most effective and ethical methods for evaluating librarians as teachers?
2. What variables must be considered in research questions to measure outcomes for a library instruction or an information literacy program?
3. What are the most effective tools for assessing the impact of a library instruction or an information literacy program?
4. How effective are formative versus summative assessments of instruction in libraries?
5. How can we institute a culture of assessment at our libraries?

B. Assessment of Learning Outcomes

Assessment of educational outcomes provides measurable accountability for both teacher and learner. An increasing number of articles are focusing on assessing learning outcomes in relation to specific goals and standards. The research literature focuses primarily on first level students in general courses (e.g., composition) with increasing emphasis on discipline-based courses (e.g., education, engineering, music, psychology) and a few articles on graduate and doctoral level students and courses. There are also an increasing number of articles on the collaboration of faculty and librarians in assessing/evaluating library instruction. Surveys, case studies, and pre-tests and post-tests continue to represent the assessment/evaluation tools most used. The tools are administered most often to students who participated in some form of library instruction, i.e., course-integrated sessions, credit courses, and tutorials.

1. In what ways does information literacy instruction have a lasting impact on the ways individuals approach or think about research?
2. How do library instruction and library usage impact academic success?
3. How can assessment of information literacy be integrated into other institutional assessment measurements?
4. What are the most effective tools for benchmarking information literacy abilities and progress?

5. What, if any, standardized testing methods can be developed to assess information literacy abilities in various groups of learners?
6. What are the most cost-effective methods for assessment of learning outcomes?

C. Transferability

Transferability of successful models of information literacy programs — whether between courses at the same institution or between institutions — is important for furthering collaboration and developing models of best practices. Current research concentrates on assessing the instruction designed for specific research projects, and focuses on student attitudes, opinions and satisfaction with a library instruction experience and library research experience. The literature is lacking in longitudinal studies on the impact of library instruction, and the transferability of secondary school library instruction learning outcomes to higher education and on into adult life.

1. How are the skills and knowledge developed through library instruction transferable to other research assignments, adult life situations, and the workplace?
2. How can librarians maximize the transferability of skills from one class to another, or one campus to another?
3. What is the correlation between library instruction and research skill improvement during four years of undergraduate education?

ACRL IS Research and Scholarship Committee, 2000–2002: Elizabeth Dupuis (Chair), Melissa Becher, Susan Brant, Jeffrey Bullington, Jean Caspers, Jeris Cassel, Elizabeth Evans, Karen Evans, Carolyn Frenger, Allison Level, Cynthia Levine, Glenn McGuigan, John Riddle, Linda Roccas, and Joseph Yue.

Appendix C

RE-ENVISIONING THE PHD FUNDED BY THE PEW NATIONAL TRUSTS, 1998–2003

The following was authored by Jody Nyquist, Associate Dean of the Graduate School at the University of Washington and Principal Investigator of the Re-envisioning the Ph.D. Project, and by Bettina Woodford, Program Officer at The Woodrow Wilson National Fellowship Foundation.

Reducing the rich discussion which took place at the April 2000 Conference in Seattle on “Re-envisioning the Ph.D. to Meet the Needs of the 21st Century” to a set of recommendations has been a daunting but promising challenge. Throughout two-day discussions within and across the nine sectors represented at the conference (research-intensive universities, teaching-intensive universities, K-12 education, doctoral students, government funding and hiring agencies, foundations, professional societies, educational organizations, and doctoral students), 200 participants emerged with a high level of consensus regarding the following seven propositions:

- Shareholders in doctoral education must create between and among themselves fundamental, necessary mechanisms to effect change. This will spread the risk of experimentation and improve accountability within and outside of the Academy. Change will require carefully planned, systematic collaborations among and between the various groups.
- It is essential to make transparent to prospective doctoral students what doctoral education consists of and requires.
- More systemic, long-term approaches to diversify the American intellect are needed. Recruiting and retaining to completion underrepresented minorities — and women especially.
- Numerous levers/forces can be organized to effect change including institutional/departmental program reviews, government funding agencies' policies, foundation funding, doctoral student voices, NRC ratings criteria, accrediting agencies, and expectations of employers within and outside of higher education.
- Preparation for teaching (both within and outside the Academy) must be strengthened. Teaching must be demonstrated and assessed.

- More robust and better-integrated professional development experiences must be developed.
- The nature/structure of faculty incentives to support and nurture doctoral student development must be developed and implemented for long-lasting change to occur, particularly within the cultures of the research-extensive institutions.

None of these major meta-themes from the conference can be addressed unless members of all sectors identify what they can provide to achieve the shared goals. Moving forward should be based on addressing the concerns in policies, practices, and goals for doctoral education.

Appendix D

CARNEGIE INITIATIVE ON THE DOCTORATE: CID 2002–2006

The Carnegie Initiative on the Doctorate (CID) was a five-year action and research project that worked with doctoral-granting departments expressing a commitment towards restructuring their programs to better prepare graduates. Six disciplines were included: chemistry, education, English, history, mathematics and neuroscience. The Initiative's assumptions are reproduced below.

The Carnegie Foundation is engaged in field-building and knowledge-building. The strategies of the Initiative rest on five assumptions about how to catalyze change in doctoral education:

Work is grounded in disciplines. The CID is focusing on only six disciplines in order to gain deep understanding and to have a discipline-wide impact.

Work is grounded in departments. Not only do we focus on disciplines, but within disciplines we assume that the key educational community is the academic department: the nexus of the discipline and the institution.

Ideas are powerful incentives for change. Ideas are more compelling and more persuasive than either financial incentives or lists of “best practices.”

Other disciplines have much to offer. Every field and each doctoral program has strategies for doctoral education that serve remarkably well, and others can learn from these practices.

Graduate students play a valuable role. Doctoral students want to learn and be challenged in their doctoral programs. Their input is essential for creating effective doctoral programs. Those who become graduate faculty members will be more reflective about the conduct of doctoral education.

Appendix E

CARL RESEARCH DATA WORKING GROUP

This Research Data Working Group has established three task groups to facilitate its agenda, and Margaret Haines, Head Librarian at Carleton University's Library heads up a group focused on Skills, Training and Rewards. A Gap Analysis in October 2008 titled "Stewardship of Research Data in Canada" identifies a large gap from current norms to an ideal state, as outlined below.

Skills and Training

Ideal State

Data stewardship activities are widespread and supported by specially trained data scientists and information professionals; and researchers are well educated on the principles of data stewardship and its importance, and aware of their own roles and responsibilities.

Current State

No detailed survey has been done in terms of skills and training levels; however, the literature indicates:

- Many researchers are unfamiliar with data stewardship processes, including the importance of metadata.
- Few researchers have had specific training in database development and preservation.
- There is a reticence amongst many to assume responsibility for data stewardship beyond the researchers' immediate interests.

Gaps

There are insufficient numbers of trained scientists and information professionals with knowledge of data cataloguing, metadata standards and processes, preservation management and assessing the value of data to support researchers. Data managers are not widely regarded as essential to the research enterprise and remain vulnerable to budget pressures, even more so when such "library overheads" require budget increases. There is also a general lack of awareness of the importance of data management in the research community and there are few opportunities for researchers to receive training on data management issues.

Appendix F

JOINT STATEMENT OF SKILLS TRAINING FOR REQUIREMENTS FOR RESEARCH STUDENTS

The Research Councils in the U.K. issued the following statement in 2001, establishing a series of guidelines for providing support to graduate students. The statement is reproduced below in its entirety.

Introduction

The Research Councils and the Arts and Humanities Research Board play an important role in setting standards and identifying best practices in research training. This document sets out a joint statement of the skills that doctoral research students funded by the Research Councils/AHRB would be expected to develop during their research training.

These skills may be present on commencement, explicitly taught, or developed during the course of the research. It is expected that different mechanisms will be used to support learning as appropriate, including self-direction, supervisor support and mentoring, departmental support, workshops, conferences, elective training courses, formally assessed courses and informal opportunities.

The Research Councils and the AHRB would also want to re-emphasise their belief that training in research skills and techniques is the key element in the development of a research student, and that PhD students are expected to make a substantial, original contribution to knowledge in their area, normally leading to published work. The development of wider employment-related skills should not detract from that core objective.

The purpose of this statement is to give a common view of the skills and experience of a typical research student thereby providing universities with a clear and consistent message aimed at helping them to ensure that all research training was of the highest standard, across all disciplines. It is not the intention of this document to provide assessment criteria for research training.

It is expected that each Council/Board will have additional requirements specific to their field of interest and will continue to have their own measures for the evaluation of research training within institutions.

Joint Research Councils' Skills Training Requirements

(A) Research Skills and Techniques — To be able to demonstrate:

1. the ability to recognise and validate problems
2. original, independent and critical thinking, and the ability to develop theoretical concepts
3. a knowledge of recent advances within one's field and in related areas
4. an understanding of relevant research methodologies and techniques and their appropriate application within one's research field
5. the ability to critically analyse and evaluate one's findings and those of others
6. an ability to summarise, document, report and reflect on progress

(B) Research Environment — To be able to:

1. show a broad understanding of the context in which research takes place
2. demonstrate awareness of issues relating to the rights of other researchers, of research subjects, and of others who may be affected by the research, e.g. confidentiality, ethical issues, attribution, copyright, malpractice, ownership of data and the requirements of the Data Protection Act
3. demonstrate appreciation of standards of good research practice in their institution and/or discipline
4. understand relevant health and safety issues and demonstrate responsible working practices
5. justify one's own research and contribute to promoting the public understanding of one's research field
6. understand the process of academic or commercial exploitation of research results

(C) Research Management — To be able to:

1. apply effective project management through the setting of research goals, intermediate milestones and prioritisation of activities
2. design and execute systems for the acquisition and collation of information through the effective use of appropriate resources and equipment
3. identify and access appropriate bibliographical resources, archives, and other sources of relevant information
4. use information technology appropriately for database management, recording and presenting information

(D) Personal Effectiveness — To be able to:

1. demonstrate a willingness and ability to learn and acquire knowledge
2. be creative, innovative and original in one's approach to research
3. demonstrate flexibility and open-mindedness
4. demonstrate self-awareness and the ability to identify own training needs
5. demonstrate self-discipline, motivation, and thoroughness
6. recognise boundaries and draw upon/use sources of support as appropriate
7. show initiative, work independently and be self-reliant

(E) Communication Skills — To be able to:

1. write clearly and in a style appropriate to purpose, e.g. progress reports, published documents, thesis
2. construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques
3. constructively defend research outcomes at seminars and viva examination
4. effectively support the learning of others when involved in teaching, mentoring or demonstrating activities

(F) Networking and Teamworking — To be able to:

1. develop and maintain co-operative networks and working relationships with supervisors, colleagues and peers, within the institution and the wider research community
2. understand one's behaviours and impact on others when working in and contributing to the success of formal and informal teams
3. listen, give and receive feedback and respond perceptively to others

(G) Career Management — To be able to:

1. appreciate the need for and show commitment to continued professional development
2. take ownership for and manage one's career progression, set realistic and achievable career goals, and identify and develop ways to improve employability

3. demonstrate an insight into the transferable nature of research skills to other work environments and the range of career opportunities within and outside academia
4. present one's skills, personal attributes and experiences through effective CVs, applications and interviews

Appendix G

THE ROBERTS AGENDA FACTSHEET

The Roberts Agenda relates to training and development for doctoral students and post-doctoral research staff, and is reproduced below in its entirety.

Introduction

This factsheet has been produced by the Training Team in the Graduate School in order to answer some frequently asked questions about the Roberts Agenda and to provide further information for people at King's [College, London] who are not sure what it is.

What is “the Roberts Agenda”?

The Roberts Agenda is a national agenda of personal, professional and career training and development for PhD students and postdoctoral research staff, often collectively referred to as “early stage researchers”.

Where does the Roberts Agenda come from?

The Roberts Agenda was initially prompted by a report in 2002, chaired by Professor Sir Gareth Roberts and entitled “SET for Success”. The report reviewed the supply of people in science, engineering and technology (the “SET” disciplines) and made the recommendation that all PhD students and postdoctoral researchers should undertake a minimum of 2 weeks training per year in transferable and generic skills. The Government backed the findings of this report and distributed funds to the Research Councils to pay for this additional training. This money is referred to as “the Roberts money”.

What is “transferable and generic skills training”?

Transferable and generic skills training is training that is considered to help people develop employability skills, and improve their current experience as researchers. With particular reference to PhD students, this type of training is also intended to improve their chances of completing their PhD successfully within the relevant timeframes. Although the Roberts Agenda was largely driven by the need for researchers to develop skills that will make them more marketable to industry, these skills are also crucial for those who wish to become academics. The skills are defined using Sections C-G of the Joint Skills Statement (JSS) issued by the Research Councils in 2001 and appended to this factsheet.

Can I use the money to pay for my students to learn to use a FACS machine or electron microscope?

No. These types of skills (research-specific skills) are referred to in Sections A and B of the Joint Skills Statement. The Research Councils expect the institution to be providing these skills already. The additional Roberts money is for new training and development activities covering Sections C-G only.

Do I have to give up extra time to teach my students all these additional skills?

Well, to some extent you do already teach them some of these skills as a good supervisor. You talk to them about the production of a good thesis (writing skills) and encourage them to talk to other researchers in the field (networking skills), but no, the College has decided to use these funds centrally and it is the remit of the Graduate School to provide training and development opportunities in these areas.

What is available for my students and post-docs?

All research students and research staff at King's have access to the Researcher Development Programme, which is the name for the Graduate School's programme of activities under the Roberts Agenda. This encompasses a full range of transferable and generic skills training courses which are all free of charge to attend. In addition, support is available for other activities including funds for networking events and researcher fora. For example, two post- doc fora have been established – one in the James Black Centre at Denmark Hill and one in the Dental Institute at Guys. Eventually it is intended that there should be at least one on each campus and that they will all network with each other. In addition, support is provided for action learning sets for researchers and to fund a dedicated Careers Adviser.

This just sounds like more time away from their research project to me.

It is true that early stage researchers will have to attend some training courses in order to make up their entitlement of 2 weeks worth of training per year. However, many of our courses are now available online via our Virtual Learning Environment that all PhD students and post-docs are registered to use. In addition, the College has taken the view that other development activities can be used to contribute towards the 2 weeks worth, including attendance at conference, running events, presenting at a research seminar etc.

The Research Councils require all of their funded students and post-docs to fulfil this training requirement, and the College has endorsed the policy that all research students should attend this amount of transferable skills training.

Can I get hold of any of the money to use for training with my students?

Yes, you can. Also incorporated into the Researcher Development Programme is an “Open Competition” which runs twice a year. Anyone within King's can apply to the competition for funding for new and innovative projects which fulfil the Roberts requirements and provide Further details including deadlines and an application form can be found on the Graduate School's webpages and we welcome all applications.

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