Changing technologies in Canadian academic library user education

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The traditional academic library is changing rapidly. The widespread use of electronic technologies has had a tremendous impact upon information retrieval within the library. As well, there is increasing awareness of the need to develop information literacy skills in graduates. This research was undertaken to determine how library user education in Canadian academic libraries is evolving to meet this need in the current dynamic environment. The survey data revealed that traditional content and delivery continue to be stressed. However, technology is reportedly changing user education in positive ways, towards the teaching of critical evaluation and research strategies, and incorporating more hands-on user training.

Introduction

During the past decade, academic libraries have profoundly broadened the range of information formats made available to their patrons, and provided increasingly sophisticated technology for patrons to access information in these formats. Accordingly, academic librarians' work in educating library users about this increasingly complex world of information retrieval has been critically affected.

The burgeoning literature on instructing library users demonstrates that the issue of teaching by academic librarians has never been as widely discussed as it is currently. Several reasons may be postulated as to why this heightened level of discussion is occurring. First, the widespread use of electronic technologies has had a tremendous impact upon information retrieval within the library, affecting not only access to in-house resources but also to databases and catalogues located at a distance (Wallace 1993; Wozny 1988). In this altered and dynamic environment, users must become familiar with a far greater number of information resources than was traditionally the case. As well, the proliferation of information-bearing formats within the average academic library (paper, microfiche, CD-ROM, online catalogues, databases, Internet) has considerably complicated the mechanics of the retrieval process for users. The search process also has been made more complex by the need to evaluate

the relevance of the massive amount of information that can potentially be retrieved, such that users must be much more astute that previously when making judgements both about the information source and its content (Atton 1994; Oberman 1991). Finally, institutions of higher education are making links between information literacy skills and an educated student body: the ability to locate, manipulate, analyse, and synthesize information is increasingly recognized as essential for the knowledge-intensive professions of the changing economy.

In light of these factors, it is understandable that academic librarians express a great deal of concern about how best to develop appropriate information retrieval and evaluative skills among their primary clientele. Despite the existence of sanctioned guidelines (ACRL 1987, 1990), the literature confirms that formal and informal user education (or more traditionally, bibliographic instruction) practices vary widely. However, given the rapidity of change in academic libraries, it is not clear how user education is evolving to meet the needs of a diverse student body that is dealing with an information world of increasing technological complexity.

Although a definitive trend has not emerged, recent evidence from the United States suggests that there are indications of both changing content and methodologies in user education. Traditionally, the content of user education programs has stressed where to locate materials in the library and how to use key resources such as the catalogue, reference sources, periodicals, and periodicals indexes. However, some recent surveys of user education practice have shown that the content of user education is changing to include a greater emphasis on critical thinking, research strategies, and electronic searching. Rowe's survey (1994) of Florida academic libraries revealed that user education in these libraries focused strongly on electronic searching and that there was a renewed interest in offering credit courses that would foster information literacy and research skills. Rowe also noted that much more emphasis was being placed on subject-specific user education. Similarly, Wittkopf (1991) commented that there has been a shift away from "tool-specific instruction toward the development of research skills and strategies." Whether these new conceptual emphases are supplemental or are actually replacing the traditional content is not known, however. For instance, Mensching (1989) found that user education programs in the colleges that she studied were less likely to stress evaluation of information and critical thinking skills, and maintained a strong focus on traditional library tours and general introductions to reference materials and indexes.

There are also some indications that the methodologies for delivering user education are changing. Numerous studies show that traditional methods of delivery, such as classroom lectures, subject guides, and individual instruction,

are still very prominent. For instance, Affleck's study (1992) of user education in community colleges revealed that the most common methodology was the classroom lecture at the request of the professor. Dillinger and Weech (1994) and Mensching (1989) found that course-related lectures, point-of-use assistance, and library orientation tours continued to be the most widespread approaches. Nevertheless, Chadley and Gavryck's survey (1989) of ARL libraries found that self-paced computer-aided instruction was becoming a more popular methodology than in the past, and that workshops on specific topics (such as CD-ROM searching) were also increasing. Similarly, Rowe (1994) noted a definite trend towards workshops on automated searching and specialized, course-related sessions. She also found the extensive use of data projection (LCD) panels so that instructional librarians could do interactive demonstrations. Rowe further noted that libraries were struggling to upgrade their classrooms and/or hand-on labs so that more students could be accommodated in automated workshops.

Prior to this research project, comparative evidence from Canada was limited. A survey of nine college libraries in the Montreal area found that user education methods in these institutions included guided tours, written documentation, audio-visual materials, and in-class lectures (Pagé and Reid 1988). All the colleges were found to provide individual assistance. Content of the libraries' user education programs included location of materials, use of the catalogue and specific reference sources, and structure of the classification system. More than half introduced research strategies to students. This study also found that none of the libraries had written objectives for their user education programs, and fewer than half evaluated their programs. Pagé and Reid (1988) concluded that user education in these libraries was lacking, since it was not always obligatory and not offered in all courses.

The last major survey of user education techniques and content in colleges and universities across Canada was conducted in the early 1980s (Beristain 1988) and is now outdated. Furthermore, the study was based on a very small sample. Nevertheless, Beristain was able to present a snapshot of user education in Canada at the time, which in many respects did not differ radically from the kinds of user education activities reported in American studies. Beristain found that user education was primarily an activity supervised by public services staff. The content of instructional activities included the use of the library in general, general and subject-based reference materials, periodicals, and indexes. A focus on end-user searching of the OPAC or other databases was not yet evident. Methods of delivery consisted of very traditional means such as course-related lectures, individualized instruction, and point-of-use assistance with bibliographic tools. Beristain concluded that "Canadian libraries follow sound, inter-

nationally recognized, instructional practices" (p. 58) and that user education was "firmly entrenched in academic libraries" (p. 74). Instructing library users may be well accepted as a professional responsibility, but has user education in Canadian academic libraries kept pace with the rapidity of change occurring on campuses and in academic libraries?

Objectives and methodology

The general objective of this research was to investigate the nature of user education as it is currently conducted in Canadian institutions of higher education. As such, the study explored a number of broad areas in relation to user education, including content of programs, methods of delivery, staffing, and funding. However, in relation to the specific area of the impact of technologies on user education, the following key questions were identified as important:

- Are academic librarians changing their pedagogical methodologies to cope with the increased demands for instruction?
- Are the conceptual underpinnings of user education changing in relation to the contemporary information retrieval environment?

These questions were explored in a structured questionnaire that included specific questions about the institution, the level of technology at the institution, and the particular characteristics of user education content and delivery at each library. The survey instrument took into account the questions asked on the previous Canadian survey (Beristain 1988) but gathered additional detailed information, particularly on whether and how the intellectual content of user education programs was perceived to be changing. The survey was pretested in the summer of 1995 on a small sample of academic librarians in Ontario.

During the fall of 1995, the final questionnaire was sent to the total population of community college and university libraries across Canada. Standard reference sources (such as the 1995 *Corpus Almanac and Canadian Sourcebook*) placed the population at about 250 institutions. However, at large universities there are often separate user education programs in the different campus libraries. Taking this factor into account, the total number of questionnaires distributed was 309, specifically directed to user education and/or reference librarians.

A response rate of 53% (164 surveys) was attained. The responses were coded and entered into a data matrix by means of SPSS for Windows. Both descriptive and inferential (Pearson's chi square) statistical analyses were carried out.

Results

The institutional setting

Slightly more university librarians (48%) responded to the survey than community college librarians (38%). Whereas 9% of responses came from affiliate colleges associated with larger universities, 5% were from hybrid institutions—the community college/university. Although the majority (55%) of respondents described their institution as small (fewer than 10,000 students), a considerable proportion (42%) described their institution as medium (10,000–20,000 students) to large (over 20,000 students). This distribution thus gave a very representative cross-section of Canadian colleges and universities.

Since we were especially interested in the impact of computer technologies on user education, a number of questions were directed toward the technological infrastructure on campus. While 63% of respondents indicated that their institution had a computerized campus-wide information system, a relatively large number of institutions (60, or 37%) did not have any such system. While 90% had an online catalogue, only half (54%) could use the OPAC interface to access other databases or networks. Given this latter finding, it was somewhat surprising that 69% indicated that they had Internet access for students in the library. Almost all sites (90%) had stand-alone CD-ROM workstations, but only 56% had networked CD-ROMs.

It seems, therefore, that while the presence of an online catalogue is now a standard feature of most Canadian academic libraries, network technology such as campus-wide information systems, in-house library networks, and access to external databases and networks, such as the Internet, are not necessarily available. This variability is directly related to the size of the institution. Cross-tabulations revealed that medium and large campuses were significantly more likely to have a greater level of technological development than small campuses ($p.<00001$). Furthermore, universities were significantly more technologically developed than community colleges ($p.<00001$). This variability in technological sophistication was found to influence both content and delivery of bibliographic instruction, as will be discussed below, and suggests that the quality of user education on some campuses may be compromised as a result. Nevertheless, despite the wide range of campus technological infrastructures, librarians are highly technology-conversant, with 81% of those responding indicating that they used computer-related technologies a great deal in the course of their daily work.

Characteristics of user education

A large part of what is considered as user education in academic libraries is

informal in nature, through the provision of guides, bibliographies, pathfinders, and the like. As anticipated, almost all of the libraries surveyed (94%) indicated that they did provide user education informally through such avenues. When asked whether or not there was a formal (defined as planned sessions) user education program at their library, 79% of respondents indicated that there was. However, the term "formal" may be ambiguous, since 72% of those actually answering this question indicated that they did not have any written objectives for their formal user education program.

Table 1 reveals the thrust of user education efforts. Traditional tool-based instruction (reference materials, printed indexes) is still very significant. However, the impact of electronic technologies is noticeable, with respect to not only the emphasis on the OPAC and CD-ROM indexes but also the growing number of institutions (52%) providing user education on external databases.

Table 1. Library resources for which user education is provided

Resource	User education provided (% respondents)
Library use in general	92.0
Catalogue/OPAC	90.7
CD-ROM indexes	86.4
Print indexes	76.5
CD-ROM/Online full text databases	73.5
Reference materials in paper format	73.5
Databases outside the institution	52.5
Library classification system	50.0
Databases inside the institution	37.0
Government documents	35.8
Audio-visual materials	21.6

The methodologies used to deliver user education are presented in Table 2. Group library tours continue to be popular (83%) despite criticism of such tours in the literature. Individualized instruction, point-of-use guides, and classroom lectures are also very common traditional approaches that are still heavily used. As other surveys have shown, the use of technical aids (such as CAI or videotapes) is persistent but not widespread. However, hands-on computer instruction in a lab setting appears to be a growing trend, also noted by Rowe (1994).

Changes to user education content, delivery, and audience

The literature about user education has undergone a shift over the last decade. Numerous authors have called for user education to become less tool-based and

Table 2. Methods used to deliver user education

Method used	% respondents
Individualized instruction	86.4
Group library tours	84.0
Point of use instruction	75.3
Classroom lectures, demonstrations	72.2
Library guides or handbooks	69.1
Pathfinders or subject guides	68.5
Point of use guides for specific tools	63.6
Hands on instruction in computer lab	43.2
Computer assisted instruction	29.6
Self-paced library tour	22.8
Posters	21.6
Term paper assistance	21.6
Videotape presentations	17.3
Non-credit course	15.4
Credit course	9.9
Workbook program	8.0

rigid, to emphasize the non-linear, recursive aspects of doing library-based research, and to integrate more critical evaluation into the process. At the same time, technology has impacted user education in a manner that cannot be ignored. There is a greater need to teach patrons about the mechanics of end-user searching in terms of how to use various pieces of equipment, how to devise a search strategy, how to navigate on various networks, and how to capture the information that has been found. Accordingly, a series of questions probed the possibility of change in user education by drawing out information on the impact of technology on user education and on the priorities assigned to various objectives of instruction.

With respect to the content of user education, over three-quarters of the respondents perceived that technology had affected the content of their programs considerably, citing examples such as increased emphasis on concepts such as boolean logic, truncation, adjacency, database construction, and search strategies. Many respondents noted a new focus on the search process and on critical evaluation of sources. It was suggested that technology had provided opportunities to "teach lateral thinking."

These perceptions, however, were not completely borne out by the rankings of possible user education objectives. The top three objectives of current user education programs (Table 3) are not particularly technology dependent, and those that are explicitly technology dependent (databases and technological innovation) are at the bottom of the rankings. It is also interesting that despite the emphasis on critical thinking and evaluation of information noted in the

Table 3. Ranking of objectives of user education program

Objective	Mean rank (existing)	Mean rank (desired)
Teach how to find information in various sources	2.6	2.0 (second)
Teach general research strategies	3.0	1.8 (first)
Teach how to locate materials in the library	3.2	2.6 (fourth)
Teach how to critically evaluate the quality and usefulness of information	3.5	2.5 (third)
Teach how databases in general are structured	4.0	3.5 (fifth)
Teach awareness of technological innovations	4.2	3.7 (sixth)

open-ended responses, only 17% of respondents indicated this objective as being either first or second in importance in current user education. These results suggest that user education in Canadian academic libraries is still very "traditional," which is partly borne out by the fact that 44% of the respondents indicated that the priorities of their user education programs had not changed in the last five years.

In light of the above, it is not surprising that judgements about the same user education objectives change somewhat when librarians are asked what is desirable (Table 3). In this scenario, teaching general research strategies is clearly ranked the most important by the largest number of librarians. There is not universal agreement, however: about 20% of respondents indicated that either locating materials in the library, knowledge of sources, or critical evaluation skills should be the most important objective. Once again, the structure of databases and awareness of technological innovation do not fare well.

With respect to the delivery of user education, 74% of respondents perceived that technology had affected their delivery considerably. Examples given included fewer lectures, more hands-on experience for participants, and more one-on-one and small-group training. Other respondents noted that technology allowed user education to be tailored for assigned research projects. Comments that technology has increased efficiency were countered with other comments—that user education is now more time-consuming and that the need for specialized equipment reduces flexibility in delivery outside the library setting. However, many participants noted that technology has made user education more dynamic and interactive and more immediately responsive to students' questions.

As might be expected, a highly significantly correlation exists between the degree of technological development of libraries' host campuses and the degree to which respondents reported that the delivery of their user education programs has been altered by technology ($p.<00001$). On campuses where significant

investments in computer-related technologies have been made, respondents were significantly more likely to have had their user education programs altered by such technologies. In light of the generally positive outcomes reported for such alterations, this finding suggests that those campuses without such infrastructure may be providing a lower quality of user education for their patrons.

Furthermore, 65% indicated that they thought that the incorporation of new technologies into their user education had improved these programs. Students are now more interested in library resources and services in general, especially journals. Some respondents noted that these technologies have improved the image of user education and have increased the time and attention given to user education. One comment suggested that these changes have made the library more visible, "more 90s." New technologies have introduced a greater variety to user education content and can lead students to valuable resources outside the library as well. One respondent noted that "students have a better understanding of the quantity and diversity of information available to them" as a result of this technology. The increasing use of self-paced and hands-on instruction is "always best," according to another comment. Other respondents noted that students are now able to search more independently and have greater self-sufficiency. Some reported that using the new technologies has "spurred a move to a critical evaluation approach" to user education. Perhaps the most cynical responses focused on the improved public relations provided by new technologies, the "gee whiz factor." As one comment pointed out, "technology is glitzy, and clients love glitz."

A related benefit (noted by 71% of respondents) is an increase in the numbers of students who are interested or participating in user education programs. The reasons for it are closely related to the benefits afforded by the new technologies. Libraries are now seen as more credible, research is more interesting, and students know that developing the skills necessary to effectively use computer technologies will increase their job prospects. Indeed, practical benefits of these changes are just as salient as the public relations factors. Respondents noted that using these technologies is relatively easy for most students, and "gets good results." Students like the flexibility and manoeuvrability of electronic formats.

Besides affecting the number of participants in user education, previous anecdotal evidence from user education librarians indicated that the introduction of computer technologies into user education also may have an impact on the gender composition of the audience, attracting more young men than women. However, these impressions were not confirmed in the survey, since 75% of the respondents stated either that they did not think the gender ratio had changed or that they simply did not know whether this was the case or not.

Conclusions

The picture that emerges from this data is one of polarization of user education practices in Canadian academic libraries. Larger libraries tend to have made significant investments in those computer-related technologies that appear to influence the content and delivery of user education in positive ways. Those libraries that have not made similar investments on behalf of their patrons may be facilitating quite a different level of information literacy. These sharp differences in user education profiles will have profound implications for the students and faculty who seek information literacy at the institutions in which they study and work. Only further investigation of the long-term outcomes of user education for students in Canadian academic libraries could confirm this speculation.

Overall, the data from this survey suggests that there is still a very large component of user education in Canadian academic libraries that stresses traditional library skills, such as orientation to areas of the collection and to the library in general. Nevertheless, increasing technological sophistication is slowly modifying user education toward approaches that emphasize the research process and critical evaluation of information sources. While these objectives may not currently be codified in formal user education program statements, they appear to be becoming the de facto goals of user education. Delivery of user education also appears to be moving from the traditional lecture method to more individualized, hands-on training. Respondents to this survey were generally positive about these changes in user education wrought by technological innovation, particularly as these changes have raised the profile of libraries and increased interest in the services that these libraries offer their clientele. Such evidence confirms the findings of Chandley and Gavryck (1989) and Rowe (1994), who report similar changes in the United States. Our data also confirm that much has changed in the content and delivery of user education in Canadian academic libraries in the past decade (cf. Beristain 1988; Pagé and Reid 1988). Further research into the outcomes of current user education approaches is required to balance the perspective provided here by those librarians charged with delivering user education. We now have a clearer picture of how they are adapting to today's information technology, but the accomplishments of their efforts toward information literacy, evidenced in the skills of their clients, remains to be investigated.

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