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Aligning library instruction with the needs of basic sciences graduate students: a case study

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Question: How can an existing library instruction program be reconfigured to reach basic sciences graduate students and other patrons missed by curriculum-based instruction?

Setting: The setting is an academic health sciences library that serves both the university and its affiliated teaching hospital.

Methods: The existing program was redesigned to incorporate a series of seven workshops that encompassed the range of information literacy skills that graduate students in the basic sciences need. In

developing the new model, the teaching librarians made changes in pedagogy, technology, marketing, and assessment strategies.

Results: Total attendance at the sessions increased substantially in the first 2 years of the new model, increasing from an average of 20 per semester to an average of 124. Survey results provided insight about what patrons wanted to learn and how best to teach it.

Conclusion: Modifying the program's content and structure resulted in a program that appealed to the target audience.

STATEMENT OF CASE

In fall 2009, the Dana Medical Library (DML) at the University of Vermont (UVM) revised its free-standing instruction program in an effort both to reach patrons who were historically missed by curriculum-based instruction and to revitalize a stagnant program. This case study reports on the process of developing a new instructional model, results achieved after the first two years, and plans for moving the program forward.

BACKGROUND

DML is the library for the health sciences at UVM in Burlington. UVM is the largest institution of higher education in the state of Vermont, enrolling approximately 10,459 undergraduate students, 1,979 graduate students, and 1,023 nondegree students in fall 2011, including 449 students in the College of Medicine (COM) and 794 students in the College of Nursing and Health Sciences (CNHS). DML delivers the majority of its information literacy instruction via its liaison program. Liaison librarians who provide curriculum-based instruction reach students in nearly all the COM and CNHS programs and departments and the residency programs at Fletcher Allen Health Care (FAHC), with one important exception: the COM graduate students in the basic sciences. Despite multiple attempts to pick up teaching slots in the graduate program curricula, the DML librarians experienced limited success in reaching this patron constituency.

Nevertheless, recent evidence has suggested that UVM COM graduate students could benefit from information literacy instruction [1], especially as it pertains to library services and resources. These students are often new to the institution and the community and may initially be unsure of how to navigate the vast array of electronic resources

available on campus. Students for whom English is a second language sometimes need extra assistance in learning to navigate the system. The students belong to very small cohorts, often only two to four students a year in each of six to eight different departments. Despite these challenges, the students are generally expected to be able to conduct efficient literature searches for their research very early in their careers.

A review of the literature confirmed these findings. Rempel and Davidson [2] report that graduate students who have attended their workshops arrive with limited awareness of interlibrary loan and subject database searching. Graduate students themselves express interest in workshops on developing searching skills, keeping current, and using reference management software [3]. Students prefer skill-based workshops over theoretical content [4]. Some graduate students have expressed a preference for online instruction [3] but may not use online tutorials when they are available [4].

Graduate programs with a commitment to information literacy and a critical mass of graduate students benefit from curriculum-integrated instruction [5]. A single library-based workshop, though limited in the number of topics addressed, can meet the needs of graduate students from a variety of programs, independent of faculty involvement [2]. Graduate faculty often do not see the need to educate their students in the literature review process, perhaps because they believe these students are already adept at it or because faculty do not give high priority to the literature review [6].

In addition to curriculum-based instruction, DML has long offered a free-standing instruction program for patrons who were not enrolled in a particular program of study or who might desire instruction beyond what they received in the classroom. These one-hour, walk-in library classes covered topics such as basic orientation to library resources, access to electronic journals, exploration of clinical or

Table 1
Components of the 2010 funding to publication workshop series

Title	Description	Instructors	Dates/Times
Orientation	Introduction to Dana Medical Library resources and services. Includes logging on to the network and accessing resources remotely.	Librarians	September 15, noon–1 p.m.; September 16, noon–1 p.m.
Advanced Literature Searching	Discover expert search techniques to refine and focus your literature searches. Use MyNCBI to set up email alerts and to save settings, search strategies, bibliographies.	Librarians	September 22, noon–1 p.m.; September 23, noon–1 p.m.
Managing References with EndNote	Create a list of references in EndNote, download records from online databases, and insert references into a manuscript using EndNote and Microsoft Word.	Librarian	September 29, noon–1 p.m.; September 30, noon–1 p.m.
Beyond PubMed	Explore other high-quality databases and information sources in the biomedical sciences.	Librarians	October 6, noon–1 p.m.; October 7, noon–1 p.m.
Preparing a Scientific or Academic Poster	Learn guidelines for creating legible, attractive, and effective scientific posters. Identify sources of medical images and discuss associated copyright issues.	Librarian and medical photographer	October 13, noon–1 p.m.; October 14, noon–1 p.m.
Scholarly Publishing	Evaluate approaches to assessing journal quality. Learn how to determine author's rights. Explore alternative publishing models.	Librarian and professor of microbiology	October 20, noon–1 p.m.; October 21, noon–1 p.m.
Identifying Funding	Learn to use grant-seeking and grant-writing resources available to researchers at the University of Vermont.	Grant resources specialist	October 27, noon–1 p.m.; October 28, noon–1 p.m.

point-of-care resources, searching of specific databases, and use of reference management software. The classes were not scheduled in any particular order, and they were offered on a variety of days and times throughout the week to suit the librarians' schedules.

Although this program had been included in the regular lineup of library services for years, historically, its sessions were poorly attended. As a group not yet reached by curriculum-based instruction, it was hoped that the COM graduate students would take advantage of these sessions, but they rarely did. Programmatic changes made in the mid-2000s resulted in a modest increase in attendance initially, but gradually the number of attendees fell back to earlier levels. Though the free-standing instruction program was admittedly of value to the library as a marketing tool, in light of its low attendance figures, the wisdom of continuing the program in its current form came under question.

With dual goals of addressing the basic sciences graduate students' unmet need for information literacy instruction and improving the free-standing library instruction program overall, DML librarians set out to revamp the existing program.

METHODOLOGY

The eight reference/instruction librarians of DML met in fall 2009 to begin the planning process. Every assumption about the library's existing instruction program was examined and challenged: Should the program be continued? If so, what content should be offered? On what days and times should the sessions be scheduled? Should they be hands-on or lecture and demonstration format? To answer these questions, faculty members from several departments in the basic sciences were interviewed. With their knowledge of the graduate students' class and meeting schedules,

they were able to offer valuable suggestions for scheduling and content.

Considering the importance that the program plays in conveying the role of the library in information literacy education on campus, the decision was made early on to continue the program. Once that decision was made, the first aspect to come under scrutiny was the program's content and structure. Under the previous model, the class sessions often focused on specific techniques for searching a database or resource, rather than on the literature search process as a whole. This focus conveyed the notion that the literature searching process is straightforward and linear and proceeds methodically from one step to the next until an identifiable endpoint is reached. In reality, the process is far more iterative and circuitous and draws from a wide variety of information resources, not just bibliographic databases. It was clear that a much broader approach was needed. Teaching methods were examined as well. Under the old model, librarians often succumbed to the temptation to cover as much content as possible using a didactic lecture and demonstration format. This approach left little free time for attendees to absorb the instruction, much less to contemplate how they might actually use that information in their work.

After months of discussions, a new model was developed that consisted of a series of seven interrelated workshops that would encompass the range of information literacy skills needed by incoming graduate students. Though designed to meet the needs of graduate students, the series was open to any UVM or FAHC affiliate. Referred to as the "Funding to Publication" workshop series, it opened with an orientation, followed by sessions on advanced literature searching, reference management, scientific posters, scholarly publishing, copyright, and external funding (Table 1). Following faculty advice, the sessions were scheduled for noon on Wednesday and Thursdays in the middle of the fall

Table 2

Number of attendees under old model versus first two years of the new model

	Average # of attendees under old model*	# attendees fall 2010	# attendees fall 2011
Graduate students	8	70	29
Faculty	3	33	30
University staff	6	4	24
Hospital residents	1	22	21
Hospital nurses	2	9	6
Total	20	138	110

* Average of attendees in fall semesters in 2006, 2007, and 2008.

semester, with the same content offered both days. Light refreshments were an added draw.

The structure of the sessions was converted from a traditional lecture and demonstration format to one that was more interactive and varied to reach students with different learning styles. Lecture periods were shortened to ten to twenty minutes, followed by ten to fifteen minutes of practice time, followed by one or two repeat lecture and practice cycles, for a total of sixty minutes. Librarian instructors were recruited for each session based on their areas of expertise. For several of the sessions, experts from outside the library were brought in to team-teach with a DML librarian. Attendees were asked to register in advance, although walk-ins were welcomed.

A dedicated website was created for the series, using the Springshare LibGuides template. Internal pages containing links to slide presentations, databases, tutorials, and related websites were created for each session and were used as an outline for the live presentations. Following a faculty suggestion, the sessions were videotaped with a digital camera on a tripod, and the files were uploaded to the website.

In the first year, a concerted effort to reach the COM basic sciences graduate students was made through intensive marketing. Email notices including links to

the series' home page were sent directly to staff and faculty involved in the graduate programs, who then forwarded them to the students. Midway through the 2010 series, graduate students received email reminders about the final three sessions. Reminder emails were sent to registrants the day before each session. Campus-wide publicity was achieved through weekly listings on the university and hospital news outlets. Color flyers were posted throughout the library and in strategic locations on campus. In 2011, marketing activities were scaled back, under the assumption that the series was now sufficiently well established.

Evaluation of the program had both quantitative and qualitative aspects. For each session, statistics were collected on attendee demographics. Before the series began, a pre-workshop survey was sent to registrants to identify their expectations. This was followed by a midpoint survey and a final survey that evaluated the series as a whole. The results of these surveys were used to modify the program on a continuous basis, and the surveys themselves were revised as needed to elicit the desired information. Debriefing meetings were held after each session and at the end of the series to discuss pedagogical and technological issues. Following completion of the series in 2010, the COM director of graduate education was again consulted for feedback and suggestions for improvement.

RESULTS

The new program was first offered in fall 2010 and was repeated with slight modifications in fall 2011. Many more students attended the classes both years compared to the average for the previous three fall semesters. Though the number of graduate students attending was greater in 2010 than in 2011, in both years attendance was higher than under the previous model (Table 2).

Figure 1

Number of attendees for each session

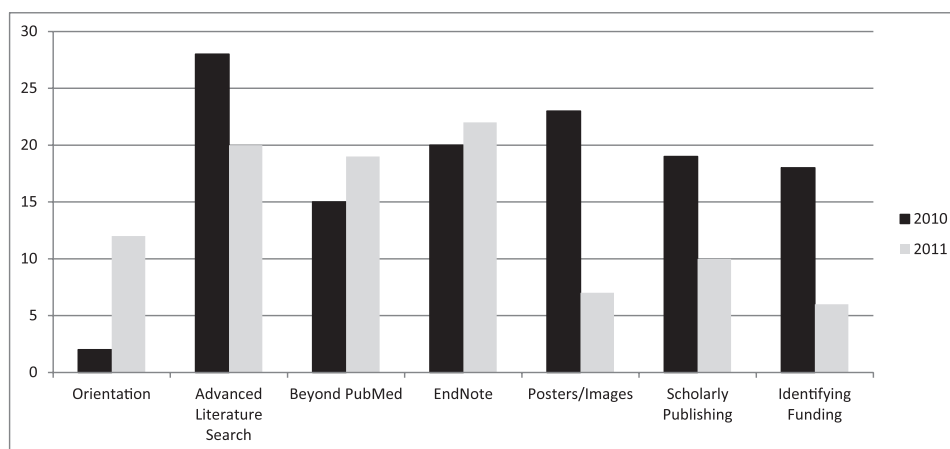


Table 3
Number of unique attendees in first two years of the workshop series*

	2010	2011
Faculty	12	13
University staff	3	4
Graduate students	18	16
Hospital nurses	5	3
Hospital residents	6	5
Total	44	41

* May have attended one or more sessions.

Attendance varied depending on session topics, with "Advanced Literature Searching," "Beyond PubMed," and "Managing References with EndNote" workshops being most popular. The number of people who registered in advance for a session, however, did not correlate well to the number who actually attended, which complicated the planning process. Attendance also changed as the series progressed, dropping slightly for the last three sessions in 2010 and quite dramatically in 2011 (Figure 1). Overall, forty-four individuals attended the series in 2010, while forty-one attended in 2011 (Table 3).

Survey results

In 2010, attendees were asked to complete an online survey after the workshop on "Advanced Literature Searching." When asked about the amount of hands-on time incorporated in the class, four respondents indicated they wanted more time, five were satisfied, and one person would have preferred less. With more hands-on time, the instructors had correspondingly less time to explain theoretical concepts. Would students still absorb the content? To probe this concern, the survey included a question following up on the instructor's brief explanation of Medical Subject Headings (MeSH). The survey asked, "What did the instructor mean when she said deep vein thrombosis 'maps to' venous thrombosis?" Responses included that it "means that search engines of pub med uses thesaurus," "means leads us to the larger area of venous thrombosis," and "the search is done with the terms venous thrombosis." Instructors concluded that the minimal explanation was sufficient for students at this academic level.

After the last session in 2010, attendees were asked to complete a final survey evaluating the series as a

whole. Only nine of a total of forty-four attendees responded, and though many expressed appreciation for the workshops, they offered little additional feedback. The following year, acting upon advice from a faculty member, the librarians initially intended to conduct a survey after each session, which would include several open-ended questions. Thirteen attendees responded to the first survey, but when only six responded to the second, concerns of survey fatigue were quickly raised. The remaining surveys were dropped in favor of just one more at the end of the series.

In an effort to assess the usefulness of the instruction, one survey question asked the attendees to rate how effectively the sessions provided information that they could use in their work (Table 4). Though the feedback spanned the entire range, responses of very good or excellent, considered positive responses, outnumbered responses of poor, fair, or good. Those who were not able to attend all the sessions were asked to describe the reason for their nonattendance. The majority of respondents indicated a conflict with other responsibilities, while a few noted that not all topics were of interest.

Notable differences between the 2010 and 2011 surveys were the number and quality of comments. Nine of the twenty-four comments received in 2010 were specifically in response to the question about mapping, and eleven comments simply stated that the class was worthwhile, leaving only a few useful comments, such as the concern that the scientific posters class was too basic. In 2011, a total of forty-seven comments were received. Again, eleven comments were generalizations about the positive value of the class, but the other thirty-six provided a wide range of useful feedback (Table 5). Sample comments from 2011 included: "I'd be interested in additional classes on using PubMed and other search engines, focusing on searching strategies," "[provide] information about the different ways to phrase your search term," "learned not to sign anything from a journal without reading it first!" and "I left college in 2000 and changes in technology meant I really needed this class."

Series evaluation

At the conclusion of the 2010 series, the librarians met to evaluate the success of the series and to discuss

Table 4
Effectiveness of sessions in providing information that attendees can use in their work

	2010 (44 surveys sent)			2011 (41 surveys sent)		
	Poor, fair, or good	Very good or excellent	Did not attend	Poor, fair, or good	Very good or excellent	Did not attend
Advanced Literature Searching	1	5	3	0	11	0
Beyond Pubmed	0	5	4	0	3	0
EndNote	0	6	3	N/A	N/A	N/A
Posters/Images	2	5	2	0	2	9
Scholarly Publishing	1	3	5	1	8	4
Identifying Funding	1	3	5	0	3	8

Table 5
Responses to open-ended survey questions

	# responses	Most common responses	#
2010 survey			
Advanced Literature Searching survey (28 surveys sent)			
What did the instructor mean when she said deep vein thrombosis "maps to" venous thrombosis?	9	PubMed searches for the words venous thrombosis PubMed uses a thesaurus	5 2
Was there anything you expected us to cover that was not covered?	10	No	7
All class sessions survey (44 surveys sent)			
Suggestions for improvements or other comments? For example, what was the most useful thing you learned in the sessions you attended? What other skills or information would be helpful in this series?	5	Series was good Thanks	2 2
2011 survey			
Advanced Literature Searching survey (20 surveys sent)			
What aspect of this class was most useful to you?	12	Medical Subject Headings (MeSH) How PubMed works	5 2
What would you change about this class?	10	More classes on this topic Keep to the allotted time	2
Additional comments	10	Thanks Good class	4 4
Beyond PubMed survey (19 surveys sent)			
What aspect of this class was most useful to you?	5	Web of Science PsycINFO	2 2
Did the class format (lecture, followed by practice time) work with your learning style?	3	Leave hands-on experience to the end Less practice time	1 1
Additional comments	1	Thanks	1
Final three class sessions survey (41 surveys sent)			
Suggestions for improvements or other comments? For example, what was the most useful thing you learned in the sessions you attended? What other skills or information would be helpful in this series?	6	Endnote class was good	2

their experiences in teaching the sessions. Noting the drop-off in attendance for the last three sessions, they considered shortening the series from seven to five sessions by dropping the sessions on scientific posters and identifying funding. In the end, both sessions were retained for 2011, but the poster session was substantially revised to focus instead on the use of images. The COM director of graduate education suggested that the 2011 series should be marketed to postdoctoral students as well, particularly for the last session on identifying funding sources.

Despite changes instituted after the 2010 series, overall attendance remained static in 2011, with a continued drop-off as the series progressed. Graduate student attendance declined most markedly, with thirty-one graduate students at the last three sessions in 2010, and only five attending the final three sessions of 2011. The new session offered in 2011 on images drew only one-third as many attendees as the session on scientific posters the previous year.

Use of technology

The instructors utilized the series' LibGuides website as the basis for their presentations. Unfortunately, they noticed that attendees had difficulty following along during the session, and usage statistics showed that few people accessed the series' website after the series. In response, the librarians relocated the LibGuides website to make it more visible on the library's home page. Also, in the second year, instructors were more explicit as they described the path they took to access the various links. In spite of these efforts,

usage statistics for the web pages created for the 2011 classes were no higher than in 2010. However, anecdotal information from librarians working at the reference desk indicated that attendees continued to refer to the website in the months following the series.

In 2010, each class was videotaped. While the videos' audio quality was excellent, the image capture from the overhead screen was distorted and fuzzy. In 2011, instructors switched to using Camtasia to screencast the sessions, which produced excellent results for both the projected image and the instructor's voice. Despite these improvements, usage statistics for the 2011 video files were even lower than in 2010. No video had more than four hits, and some were only viewed once, probably by the person who posted them.

DISCUSSION

Experiences with the workshop series in 2010 and 2011 resulted in several observations that will inform future efforts. Basing the content of the workshop series on recommendations from the graduate programs' faculty resulted in a lineup of classes that attracted interest and attendance from graduate students. In spite of changes made in 2011 to the series content, attendance in the second half of the series was again lower than in the first half. Perhaps topics in the first half of the workshop series are simply more compelling. A survey of science graduate students revealed a preference for workshops about searching for information, keeping current, and managing bibliographies [3].

The small number of attendees responding to the survey in the first year of the program limited the

utility of this feedback. The attempt to increase the amount of feedback from attendees in the second year was partially successful. Useful numeric data from surveys continued to be difficult to obtain, but surveying more frequently and asking more directed open-ended questions did elicit more useful feedback. Attendees indicated that the most useful content covered literature searching techniques, PubMed, EndNote, and scholarly publishing. The positive response to the hands-on component encouraged librarians to continue providing ample in-class practice time and to curtail lengthy explanations, a trend that has spilled over into curriculum-based instruction at DML. That being said, librarians are now more likely to incorporate instruction about MeSH and the MeSH Browser in their PubMed classes, reversing a recent trend at DML.

Aiming the series at graduate students attracted other patrons who believe that they are at the graduate student level—including new faculty, practicing nurses, laboratory technicians, and faculty entering a new field—resulting in a cross-pollination of ideas across disciplines. The library classroom is one of the few spaces in the academic medical center where a neuroscience graduate student may be sitting between a chemistry professor and an oncology nurse.

Intensive marketing efforts, including the mid-series email to graduate students and direct encouragement of graduate students by faculty, might have contributed to the relatively greater repeat attendance by graduate students in 2010. Cooperation of graduate faculty in marketing efforts is crucial. Graduate advisors have been found to exert great influence in promoting library events to graduate students [2]. Less aggressive marketing the following year might account for some of the drop-off in attendance. Librarians noted increased repeat attendance by university staff in 2011 compared with 2010 but were unable to identify a change that would account for the increase.

Despite faculty recommendations, the recorded sessions posted online received surprisingly little usage. Recommendations from experts in asynchronous online instruction emphasize the importance of explicitly providing students with the ability to control the presentation and with a mechanism for receiving feedback for actions that students take based on the instruction [7]. Recordings of face-to-face lectures do not allow for that kind of engagement. Even online tutorials, which theoretically provide the desired level of engagement, were found to be underutilized by graduate students [4].

Plans for repeating the series in 2012 are already underway. Because the decrease in attendance in 2011 could be attributed to the reduction in marketing efforts that year, it became apparent that aggressive marketing must be conducted each year the series is offered. The class on scientific posters, revised in 2011 to cover only images, was again not well attended and will be dropped. Removing one class will shorten the series and may enable both attendees and instructors to maintain their enthusiasm throughout the entire series.

To increase opportunities for patron feedback, DML librarians will experiment with real-time feedback mechanisms such as a web-based questionnaire deployed during a class or through the use of an audience response system. They also plan to develop an optional pre-class online tutorial for one or more of the sessions, which will ensure that all attendees enter the class with a minimum level of knowledge. DML librarians will continue to solicit feedback and suggestions from the COM director of graduate education and other faculty members in the COM graduate programs.

CONCLUSION

The revised free-standing library instruction program is a clear improvement over the previous unfocused approach. The new series appeals not only to graduate students, but also to hospital fellows, new faculty, nurses, and staff involved in research. Attendee feedback indicates that patrons like the new approach and are able to point to specific knowledge and skills gained through attendance at the workshops.

A number of valuable lessons have been learned by the teaching librarians at DML through the experience of designing, executing, and revising the new teaching model. Graduate students and advanced learners do in fact desire the complicated details of indexing, but in a condensed form that can readily be applied to their work. Allowing students to immediately put into practice what they have learned is critical to student success. Graduate students have many demands on their time, which may take precedence over attending optional classes. Working with graduate faculty to tailor library instruction content, descriptions, and scheduling to the needs of graduate students is critical to capturing this audience. Surveys that incorporate open-ended questions often elicit the most useful feedback. Finally, for a program to be successful, it must be bolstered by a tireless marketing campaign. A library education program designed to specifically address the needs and concerns of graduate students can offer valuable instruction to this underserved population.

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