Services for Graduate Students: A Review of Academic Library Web Sites

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Abstract

A library's Web site is well-recognized as the gateway to the library for the vast majority of
users. Choosing the most user-friendly Web architecture to reflect the many services libraries
offer is a complex process, and librarians are still experimenting with what works best for their
users. As part of a redesign of the Oregon State University (OSU) Libraries' Web site, entry points for
specific user groups were created. One of these user groups was graduate students. The purpose of this
study was to explore the ways that other academic libraries are designing their Web sites for
particular user groups, specifically graduate students, in order to determine how the OSU Libraries
Web site compared to peer institutions. This study analyzed 112 Association of Research Libraries'
(ARL) Web sites and 26 Oregon academic libraries' Web sites to determine the availability of
resources and services specifically promoted to graduate students. Since graduate students may
view the library Web site through the lens of either new student, researcher or instructor, Web
sites were also examined to see if sites were created with any or all of these roles in mind.
Nearly a quarter of the ARL Web sites examined contained a link on the home page for graduate
students, and another twenty percent provided graduate student information at a lower level in
their Web site hierarchy. A majority of sites had events, subject or course guides for graduate
students. Information for graduate students was typically framed in the context of graduate students as
researchers. Ideas and examples are given for ways to improve Web site design to better serve this
user group. Future studies will aim to explore what graduate students need from academic libraries,
as well as the ways these students conduct themselves in their various roles of researcher,
instructor and new student, in order to provide improved services to these students.

Introduction

A library's Web site is well-recognized as the gateway to the library for the vast majority of users. Academic libraries have embraced the shift from maintaining only a physical presence to also maintaining a virtual presence; however, determining the best way to present the library's main gateway via the Web has not been a simple task. Choosing the most user-friendly Web architecture to reflect the many services libraries offer has been a complex process, and librarians are still experimenting with what works best for their users. In the last several years, usability testing has become more common in academic libraries. One lesson that can be learned from testing efforts is the importance of tailoring the library's Web site for various user groups. Reaching out to specific user groups is one way to help libraries remain relevant among the overwhelming number of searching and finding options currently available on the Internet. This paper will explore the ways academic libraries are designing their Web presence for the specific user group of graduate students.

Literature Review

In recent years the broader academic community has increasingly focused on the importance of graduate students to the well-being of both universities and broader society. A recent report from the Council of Graduate Schools (CGS) called American universities to action. The CGS (2007) argued that continued innovation and job creation within our society are largely driven by a successful graduate education system. Librarians have also become more explicit about reaching out to graduate students. For many academic libraries, graduate students

form a key user group, both because of their intensive need for library resources and because they represent future faculty at our institutions.

This shift to focusing on graduate students has been documented only recently. Graduate students have historically received less attention in some aspects of academia, for example in the realm of student services. Jason Pontius and Shaun Harper (2006, 48) point out that because of the belief that academic programs and departments already meet the needs of graduate students, and because of the assumption that graduate students are already familiar with how to navigate academia based on their experiences as undergraduates, fewer services are targeted toward graduate students. However, the current problem may not be a lack of services available to graduate students, but rather that graduate students are poorly informed and unaware of the campus resources available to them (Nesheim et al. 2006, 14).

Indeed, graduate students are not only unaware of broader campus resources available to them, they are often unaware of what the library has to offer. Studies at the University of Iowa and at Carnegie Mellon University found that nearly half of the graduate students surveyed were not fully aware of library resources, and as a result the vast majority of these students rarely used such library services as reference consultations and instructional services (George et al. 2006, 14; Washington-Hoagland and Clougherty 2002, 134). For many years libraries have offered a wide array of services to graduate students including literature review workshops, discipline-based information literacy sessions, thesis-writing classes, and research consultations. Graduate students' lack of awareness of library services may arise not from the particular suite of library services offered to graduate students, but rather from the way graduate students locate and find out about these resources. George et al. (2006, 15) noted that a lack of knowledge of services and resources is graduate students' biggest barrier to information searching and finding.

Graduate students' lack of knowledge about library resources cannot be solved simply by promoting particular services, but rather calls for the creation of an environment that is more conducive to their particular style of student learning and discovery. In the case of graduate students, this learning is usually independent and self-driven. Based on assessment data, librarians at the University of Idaho implemented a graduate students' Web portal from their library's home page to give their graduate students a clearer path not only to library services, but also to searching and finding resources (Jankowska et al. 2006, 73). This Web portal groups graduate student-specific resources in one place, which enables students to feel more confident in carrying out library research on their own. The rationale behind creating user-specific elements on the Web site was that "it becomes critical that the library Web site, often the primary and first point of contact with the user, is clear in scope and purpose, offers a variety of levels and types of help, and targets services to different user groups" (73).

Web site design has been evolving to meet user needs since the World Wide Web exploded onto the information scene in the 1990s. Information architects have worked to ensure that certain organizational schemes are used within Web sites to help users find information easily. Web sites can be organized by user group, topic, or function. Shelly Gullikson et al. (1999, 302) explained that a combination of organizational methods is often helpful, and multiple access points are useful because not everyone navigates Web sites in the same way. In addition, Gullikson et al. noted that Web designers suggest these organizational pathways must be easy to learn and clearly labeled so that users can readily find their way through the information presented, as negative experiences with a Web site can result in nearly half of users not returning to a particular site. If Web sites only reflect the internal concerns of an organization and not the users' needs, it can be difficult for users to find information. Different

user groups may need specific interfaces in order to find their particular information of interest (Bevan 1997, 3).

An established method for constructing different user interfaces is through the use of Web site user personas. A persona is defined as "a detailed profile of a potential customer, including name, background, and hobbies" (Van Duyne et al. 2007, 885). The idea behind creating personas is to make the customer or user seem realistic in order to fabricate various scenarios the user would be likely to carry out. Alison Head (2003,16) claims that scenarios can show patterns of how users will use a Web site and can help Web designers choose navigational themes and content to match users' needs. Librarians have used this technique to develop a Web environment more suited to particular user group's needs (Breznay and Hass 2005, 74).

Librarians have observed the difficulty students have navigating their Web sites and have worked to make changes to their sites as a result of their findings. Susan Augustine and Courtney Greene (2002, 354) noted that students often used the library Web site's internal search engine rather than hunt through the library's Web pages. In a survey of library Web sites, Brian Detlor and Vivian Lewis (2006, 253) found that libraries tended to organize their Web sites around the libraries' physical and management structure instead of around particular user needs or tasks. Instead, as Detlor and Lewis (2006, 251) pointed out, the practice of focusing on particular user groups can help librarians to build Web sites around what specific user groups actually do.

Information seeking behavior studies of graduate students have shown that at least half of all graduate students use the broader internet to search for articles rather than the library's Web site. The graduate students interviewed at Carnegie Mellon University called for "more electronic resources within a user-friendly environment" (George et al. 2006). Because graduate

students find the library's Web architecture difficult to navigate and find the catalog, databases, and ejournals frustrating to use, Stein et al. (2006, 113) found students frequently bookmark highly used library resources rather than repeatedly navigating through the library's Web site. All of these examples reveal problems with library Web site architecture that could be addressed at least in part by organizing the Web site around particular user groups or tasks.

Some may argue that these navigation problems could be solved by increased personalization options. However, personalization options such as the My Library projects of the late 1990s (Ciccone 2005, 21) at North Carolina State University and at Virginia Commonwealth University (Ghaphery and Ream 2000) were found to be adopted by very few users. Users simply were not willing to put the effort into personalizing library Web sites they only visited periodically. However, researchers at the University of Minnesota have taken the personalization concept one step further by designing Web portals for specific user groups. Rather than asking users to choose an appropriate Web portal, patrons are recognized by an affinity string created by the University of Minnesota's Office of Information Technology from student information, which can then automatically route them to the appropriate portal (Hanson et al. 2008).

In an article about the future of academic library Web sites, Shu Liu (2008, 8) criticizes the idea of "one design for all" and recommends designing or organizing library Web sites by user types. Eileen Hitchingham and Donald Kenney (2002, 57) also argued that "our undergraduate, graduate, and faculty constituents cannot be considered together to create one homogenous entity called 'our users'…niche services tailored to user groups are demanded."

At Oregon State University Libraries, we used personas to assist in a redesign of our Web site, and came to the conclusion that user-specific entry points with content that matched specific

needs was a necessary part of the redesign. One of the specific user groups chosen was graduate students, and a method used to determine the types of information to include in this graduate student entry point was the review of other academic libraries' Web sites. By exploring how other academic libraries are tailoring their Web presence for graduate students, this review focuses on how this particular user group is being served and will identify trends for the future development of academic library Web sites for graduate students.

Methods

The Web sites of the 112 academic libraries that belong to ARL and of the 26 academic libraries in Oregon were reviewed in November 2008. Because one of the Oregon academic libraries belongs to ARL, the total number of Web sites analyzed was 137. Google Translate™ was used to analyze the two non-English ARL Web sites. ARL academic library Web sites were chosen for this study because they represent research institutions with graduate student populations. ARL libraries are frequently used in Web site evaluations due to their valued reputation and because of the ease with which the evaluations can be repeated by other researchers. The 26 Oregon academic libraries were chosen because the author's library is in Oregon and it was hoped that an evaluation of neighboring institutions could provide additional insights. The Oregon academic libraries evaluated also support graduate student populations.

Links and Programming for Graduate Students

The categories for analysis were chosen in order to determine whether or not these libraries offered specific services or programming for graduate students based solely on the library's Web presence. The search techniques were intentionally simple to replicate the amount of effort a student might put into trying to find these services. Sites were analyzed to find if there was a link to a page specifically titled "graduate students" on the library's home page. If a

link was not found on the home page, sites were analyzed to see if a link to such a page was present on a secondary page, such as a "services for" page or an instruction page. If a link was not found on a secondary page, the site index, when available, was searched for "graduate students." If results came up in this manner, the link was classified as being on a tertiary page. Libraries that had any links or pages specifically labeled for graduate students were classified as having a *direct effort* toward graduate students.

Users frequently navigate a Web site looking for specific topical information, as a result topical areas of interest to graduate students were also analyzed. The graduate student-oriented topical areas considered were workshop schedules, subject guides and course guides that focused on programming such as writing and researching for a literature review or thesis; EndNote or Refworks (classified as citation management resources); subject-specific database help, such as Art Index or Web of Science classes; or classes or pages that featured Web 2.0 tools for keeping up and managing information, such as RSS feeds and table of contents alerts. Course guides directly targeting graduate students, such as those for specific graduate courses, were also counted.

These types of pages and programming were considered to be graduate student-specific or appropriate due to graduate students' shift from being general searchers who use broad databases to specialized searchers who use subject-specific databases, their need to manage large amounts of information and citations over time, and the requirement that they write literature reviews and theses. While faculty may also benefit from this information, graduate students are more frequently the target of library instruction and outreach in these areas. These types of resources contrast with undergraduate resources that emphasize getting started with research, the basics of findings books and articles, and the physical location of resources in the library.

Web sites were examined for the presence of a schedule of events targeted either directly at graduate students or that listed programming that met the criteria listed above and so was considered to be at the graduate-student level. Only events scheduled for the current term (Fall 2008) were counted. Sites that only posted events from previous semesters were not counted. When sites had either graduate student appropriate scheduling and/or subject or course guides, but did not have explicit pages for graduate students, they were classified as having an *indirect effort* toward graduate students. Many sites with a direct effort toward graduate students also had events schedules and/or subject or course guides.

Graduate Students as Researchers, Instructors or New Students

In addition to examining whether or not pages were available directly or indirectly for graduate students, the focus of the pages and the particular resources available for graduate students on those pages were examined. The information available was categorized as focusing on the graduate student's role(s) as researcher, instructor, or new student.

Sites that focused on students as researchers included information about scholarship, publishing theses, copyright, and scholarly communications issues. Sites with a student-as-researcher focus also provided information or resources on how to use information management tools such as citation management software, table of contents alerts, or RSS feeds. Resources in the researcher category also included links for improved searching in specific databases, tips for using Google Scholar, and a list of subject specialist librarians.

The information provided for graduate students as instructors or teaching assistants included information about how to put items on course reserves, how to request instruction for a class, information about how to create effective research assignments, links to information literacy tutorials, and information about how to create persistent links.

While the information provided for graduate students as new students was sometimes categorized on the Web site as research assistance, for this study much of this information was characterized as being for new students or users new to the library. New student information included links to library policies, such as borrowing information, directions about how to connect from off-campus, details on how to manage a library account, welcoming or orientation information, such as new graduate student tours, and general overviews of how to use the catalog or databases.

Scholarly Communication

Sites were also examined to determine if scholarly communications resources were included on graduate student-specific pages. For the purposes of this research, "scholarly communications" was defined broadly to include references to copyright and publishing information as well as direct references to scholarly communications.

Limitations

It should be noted that not every available Web resource for graduate students may have been analyzed, for example, those resources which are behind an institutional firewall. No firewalls were encountered, and the best effort was made to uncover all information regarding graduate students on each institution's Web site.

The aim of this study was to observe the ways libraries make programming and resources explicitly available to the specific user group of graduate students. As a result, this review did not parse out graduate student-appropriate resources that are part of other resources lists, for example databases such as the Web of Science from the databases list. Graduate students searching topically would hopefully still find this information even though it is not specifically

categorized as being for graduate students.   This study was not able to track every potential resource a graduate student might use on a library's Web site.

Results

The number of Oregon academic libraries with a focus on graduate students was small. Because of this, the ARL and Oregon results are reported separately.

Direct, Indirect or No Effort Toward Graduate Students

Of the ARL Web sites examined in this study, 24 percent (27 sites) contained a link on the home page for graduate students. An additional 11 percent (12 sites) had a link on a secondary page and 8 percent (9 sites) had a link on a tertiary page (see table 1). A total of 43 percent of sites (48 sites) had a direct effort toward graduate students. However, 42 percent (47 sites) of the Web sites analyzed had only an indirect effort toward graduate students and 15 percent (17 sites) had neither a direct nor an indirect effort toward graduate students (see table 1).

[PLACE TABLE 1 HERE]

ARL sites with a link on their home page for graduate students typically had the link clustered within a list of other user groups, such as undergraduates, faculty, graduate students, alumni, and visitors.   Alternative locations for the link were under a "for students" section or under a "services" or "resources for…" heading.   Sites with a link on a secondary page most frequently had a link for graduate students under a "services" or "resources" heading. Other

headings where resources for graduate students could be found was under "research and scholarship," "teaching," "classes and workshops," "ask us," and "help yourself." Because the tertiary sites for graduate students were found with the site search feature, no patterns were established for where these sites were housed. Often, these sites appeared to be stand-alone pages that may have been created separately from the main architecture of the site.

Programming for Graduate Students

Of the ARL sites examined, 56 percent (63 sites) had a schedule of events or calendar with opportunities that were classified as appropriate for a graduate student audience. These types of events included citation management classes, subject-specific database classes or classes on Web 2.0 tools. In addition, 54 percent of the sites (60 sites) had at least one subject guide that was at the graduate student level (see table 2). Sites also had a combination of both events schedules and subject guides. Of the 63 sites with at least one event listing, 32 percent (20 sites) only offered citation management software workshops (such as EndNote or Refworks classes). Other workshops offered included database-specific workshops, dissertation finding workshops, keeping current workshops, scholarly communications workshops, library research workshops, GIS workshops, how to use digital equipment workshops, and workshops addressing how to carry out the literature review.

Of the 60 ARL sites with at least one subject or course guide, 40 percent (24 sites) only offered a guide to using citation management software (see table 2). Other subject guides included how to carry out the literature review, how to use table of contents alerts, scholarly communications information, specific subject-based guides marketed specifically to graduate students, and guides to Web 2.0 tools, such as RSS feeds and social bookmarking software.

[PLACE TABLE 2 HERE]

Graduate Students as Researchers, Instructors or New Students

Of the 96 ARL sites that had information either directly or indirectly focused on graduate students, 47 percent had information only for graduate students as researchers, 2 percent had information for graduate students only as new students, and 1 percent had information only for graduate student as instructors; 27 percent had information for graduate students as researchers, instructors and new students; 15 percent had information for graduate students as researchers and instructors; and 8 percent had information for graduate students as researchers and new students (see figure 1).

[PLACE FIGURE 1 HERE]

Scholarly Communications

Of the ARL sites with a graduate-student specific focus, 15 sites provided resources related to scholarly communications. These sites represented 12 percent of the total number of sites analyzed and 31 percent of those sites that had a direct focus on graduate students.

Oregon Academic Libraries

Of the twenty-six Oregon universities with graduate programs, four schools serve only graduate student populations. These included seminaries and medical professional schools and were excluded from this analysis, as their library Web sites had no need to identify graduate students as a separate user group. Of the remaining twenty-two university library Web sites,

three showed a direct focus toward graduate students. One of these libraries had information for graduate students on the home page and two had information on a secondary page.

In addition to library Web sites with a direct focus toward graduate students, eight Oregon academic library Web sites had an indirect focus toward graduate students. Events schedules were found on two sites, and graduate-student appropriate subject guides were found on seven sites. Of the eleven sites with either a direct or indirect effort toward graduate students, two sites addressed graduate students' needs only as new students, eight addressed graduate students' needs as researchers, and one site addressed graduate students' needs as both instructors and researchers.

Discussion

Overall, the number of ARL Web sites with a specific link for graduate students on their home page was low, at almost a quarter of the sites examined. This lack of prioritization of graduate student services on academic library Web sites shows that libraries still have room for improvement in moving toward full recognition of the importance of providing specialized services to this key user group. This review suggests that while some academic libraries are acknowledging that different user groups may be best served by designing the library's Web site to meet specific user group's needs, there are still many sites that could move in this direction.

While links for graduate students were organized both within a list of other user groups, such as undergraduates, faculty and visitors, as well as by functionality, such as teaching or research and scholarship, Web designers have found the best organizational method from a user standpoint is to cluster user groups together. Organizing by user group creates a clear

navigational expectation for users and provides clear labels, thereby meeting Gullikson et al.'s recommendation that organizational pathways be easy to learn and clearly identified (1999, 294).

Approximately half of the Web sites surveyed in this study had events schedules and subject guides or course pages with information at a graduate student level. The types of events and subject guides or course pages geared toward graduate students were often narrow in scope, as shown by the fact that nearly a third of the sites only listed events or guides about how to use citation management software. Addressing the information management needs of graduate students is a key part of helping graduate students become scholars. However, if libraries are only providing instruction on one element of the information cycle and are not capitalizing on the additional information literacy connections they could make with this audience, they may be missing an opportunity to help students become more effective information users. Graduate students might be better served if these information tools were taught alongside courses on broader topics such as keeping current with research, using information from a particular scholarly community or in combination with seminars on the literature review process or thesis writing. However, presenting graduate students with information on citation management tools is a step in the right direction, because as Detlor and Lewis note, it is important to "support information use, not just information access (2006, 256)."

Another example of how academic libraries can use graduate student-focused Web sites to expand the types of information they promote is to include scholarly communication resources on graduate student Web sites. In 2001, Lance Lugar and Kate Thomes examined ARL Web sites and found only four percent had a scholarly communication link on their home page (2002, 59). In the current study, twelve percent of the total number of sites analyzed and thirty-one percent of those sites that had a direct focus on graduate students had some type of information

about scholarly communications. This analysis shows an improvement over Lugar and Thomes'

2001 survey, at least when searching for scholarly communication resources within services for a

particular user group.

Because a broad interpretation of scholarly communication resources was used, it was not

surprising to find that libraries provided scholarly communication resources in different ways for

different graduate student audiences. For example, the University of California Davis' Web site

for graduate students addresses scholarly communication within the context of publishing, and

includes links to information on Sherpa, copyright and intellectual property, scholarly electronic

publishing initiatives, and their eScholarship Repository

(http://www.lib.ucdavis.edu/ul/help/faculty-grad.php#publish, accessed 29 September 2009).

Similarly, the University of Arizona's graduate student Web site contains a section on organizing

and writing that includes resources about copyright

(http://www.library.arizona.edu/help/how/find/GradEd.html, accessed 29 September 2009).

Conversely, Virginia Tech provides copyright information on their Web site for faculty and

graduate teaching assistants, and the information provided is targeted toward instructors

(http://scholar.lib.vt.edu/copyright/, accessed 29 September 2009). Auburn University takes

another angle by including scholarly communication under a more research-oriented theme of

"current awareness resources and preprint servers"

(http://www.lib.auburn.edu/services/facserv.html, accessed 29 September 2009). These

examples illustrate the variety of ways libraries can promote an issue of crucial importance to a

specific user group within a context that is most meaningful to them.

As alluded to in the discussion on scholarly communication resources on graduate student

Web sites, graduate students play a variety of roles on campus and there are a variety of ways

that academic libraries can present information to graduate students because of these roles. The roles identified in this study are that of new student, researcher, and instructor. Initially, graduate students are new students who need to be oriented to a new place, policies, and procedures. If graduate students use the library only periodically, they may need to be repeatedly oriented to these policies and procedures. Twenty-nine percent of the Web sites with a direct or indirect effort toward graduate students surveyed in this study included information for graduate students in their role as new students.

Simply thinking about graduate students as new students will only make the library relevant for these students in a procedural way. Additionally, using a graduate student-specific Web site solely to present policy and procedural information often makes it appear that there is little information on the page that is uniquely for graduate students. The University of British Columbia provides a good example of how to provide information that is obviously intended for graduate students. They have created a graduate student FAQ that includes a wide variety of information, from what a literature review is to finding grey literature to explaining what citation indexing is (http://toby.library.ubc.ca/webpage/webpage.cfm?id=502, accessed 11 September 2009).

Graduate students are also researchers who are carrying out research for their thesis or dissertation work and may also be involved with other research projects in their role as a graduate research assistant. Graduate students' roles as researchers are perhaps the most obvious, and this is where libraries typically put the most effort into ensuring that graduate students have the ability to use advanced databases, know about interlibrary loan, are up-to-date on citation management software options, and have the resources they need to publish their thesis. Ryan Randall et al. (2008, 21) describes how at the University of Rochester, they are

even developing a writing tool for graduate students' work as researchers that will enable them to collaborate, organize, and store their work within the context of their institutional repository. Seventy-eight percent of the Web sites with a direct or indirect effort toward graduate students surveyed in this study included information for graduate students in their role as researchers.

A good example of how to highlight library services for graduate students as researchers can be found on the University of Illinois at Urbana-Champaign site (http://www.library.illinois.edu/learn/gradstudents.html, accessed 11 September 2009). In addition to basic information on using the library, the site includes thesis support materials, a database of calls for papers, and professional development tips.

In addition to carrying out research, many graduate students are also instructors. Graduate students, particularly in the social sciences and humanities, are frequently thrust into the role of teacher for large lower-division undergraduate courses. Universities vary widely in the teaching support and resources they provide for the professional development of their graduate teaching assistants. Libraries also vary in the amount of resources and information they provide for graduate teaching assistants. Thirty-two percent of the Web sites with a direct or indirect effort toward graduate students surveyed in this study included information for graduate students in their role as instructors.

The University of Minnesota provides an excellent list of resources for graduate student instructors, including links to their Center for Teaching and Learning and their Digital Media Center (http://www.lib.umn.edu/services/grads, accessed 11 September 2009). Colorado State University includes information on how to set up a library tour, library assignment examples and tips, handouts for instructors to use in their classes, and tutorials instructors can assign (http://lib.colostate.edu/users/grad.html, accessed 11 September 2009).

In this study the best Web sites were identified using principles outlined by Gullikson et al. (1999, 294). The guidelines used included the presence of clear headings and topics that match the needs of the user. In the case of graduate students, these were needs such as thesis support information or teaching assistant resources. For example New York University breaks up their graduate student page with easy-to-follow headings like "research," "teaching," and "spaces" (http://nyu.libguides.com/grads, accessed 11 September 2009). The UC Davis site also provides simple headings – "teaching," "research," "publishing," and "library services and contacts" that match graduate student roles (http://www.lib.ucdavis.edu/ul/help/faculty-grad.php, accessed 11 September 2009).

The twenty-six Oregon academic libraries were included in this survey in order to evaluate how institutions in the author's region were representing themselves to their graduate students, as well as to determine if the author could learn something from these neighboring institutions' Web sites. Barbara Blummer (2007, 57) suggests in her literature review of Web analyses of library Web sites that researchers should sometimes look beyond ARL institutions, as information on the ARL schools is well represented, but studies on other libraries is lacking. It seemed like analyzing Oregon academic libraries of a variety of sizes would help add to the knowledge on this topic. Only three of the institutions that were surveyed are large research institutions. While the majority of these schools were smaller institutions, the smaller institutions have the potential to have a proportional number of graduate students and might have the desire to reach out specifically to this user group.

Unfortunately, the author's own institution was the only Oregon school with a graduate student Web presence on the home page. This discrepancy might be due to the fact that many of these schools offer only masters in education or masters in business administration programs that

are more similar to professional masters programs. Students in these practice-oriented programs rarely have graduate teaching assistantships or graduate research assistantships. As a result their research may take place on a different scale, and library resources may be presented to them solely as new students. In addition, there may not be an identified need for graduate students as a separate user group on these campuses.

Finally, while evaluating these Web sites, it was surprising to find that none of these sites provided a virtual community space for graduate students. Several of these academic libraries now have physical graduate student lounges and study areas, but none of them were experimenting with a virtual space for their graduate students. The library's graduate student-specific site might be an excellent place to experiment with an online community as the graduate student population is more keenly aware of the importance of interdisciplinary connections and might be more eager to put the effort into trying this type of tool. The database vendor ProQuest is stepping forward in this area by creating an online community for graduate students called GradShare (http://www.gradshare.com) in which students can ask questions of other students, information professionals, or student service professionals (Bell 2009). The questions asked on this site range from how to deal with advisors and committees to procedural questions particular to working in a specific discipline.   While this is a step in the right direction, academic libraries should not simply rely on outside groups to create connections with their students, but could build on the relationships created by programming and liaison work to create their own online communities.

One excellent way to frame the creation of online communities might be in the context of the institutional repository, as proposed by researchers at the University of Rochester (Randall et al., 2008, 21). Graduate students typically are involved in the publishing cycle and need to

create and share published works with others. Creating a community within the institutional repository with social networking features to allow interactions and easy document sharing could be a strong incentive for students to use this type of community.

Another possibility for engaging students in online communities could be within already established digital collections. As Terence Huwe (2009, 15) suggests, researchers are often the heaviest users of specialized digital collections and have an interest in connecting with others who have similar research interests. Starting an online community within this forum could serve to both expose the collections to graduate students and create connections with researchers outside of their own institutions. Building an online community based on the research-related needs graduate students have could help make these communities viable and has the potential to create social communities within a library Web site. Additionally, these types of communities would create opportunities for users to share user content, which is an avenue most libraries have yet to explore.

Conclusion

Academic libraries have begun to recognize the importance of creating Web interfaces for different user groups. To create a truly rich Web site for our graduate student users, graduate students' particular needs and roles on campus must be recognized. Graduate students' roles as researchers, instructors, and new students are a logical place to start in shaping the Web services and resources libraries present to graduate students. Academic libraries still have room to grow in providing resources for graduate students on issues like scholarly communications. Opportunities for future development of a library Web presence for graduate students could include creating online communities for graduate students that help students with research needs.

Future areas for research in this area could include an exploration of what graduate students need or want from academic libraries, as well as the ways they conduct themselves in their various roles of researcher, instructor and new student. These findings would greatly enhance the conversation about appropriate resources for graduate students. Regular assessment should be performed on the continued progress of making scholarly communications issues easily available to graduate students, as well as to other patrons. Usability testing of these graduate student-specific pages should be performed periodically to ensure the information presented matches the users' needs. Finally, as new means of creating online communities emerge, the implementation and success of these communities should be examined.

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Table 1. The percent of ARL Web sites with links that exhibit a direct effort, and where these links are located; an indirect effort, or no effort toward graduate students.

Direct, Indirect or No Effort Toward Graduate Students	Percent of ARL Sites
Direct Effort	43
Home page link	24
Secondary page link	11
Tertiary page link	8
Indirect Effort	42
No Effort	15

Table 2. The percent of ARL sites with graduate-student appropriate programming, including events schedules and/or subject and course guides, as well as the percent with only citation management information.

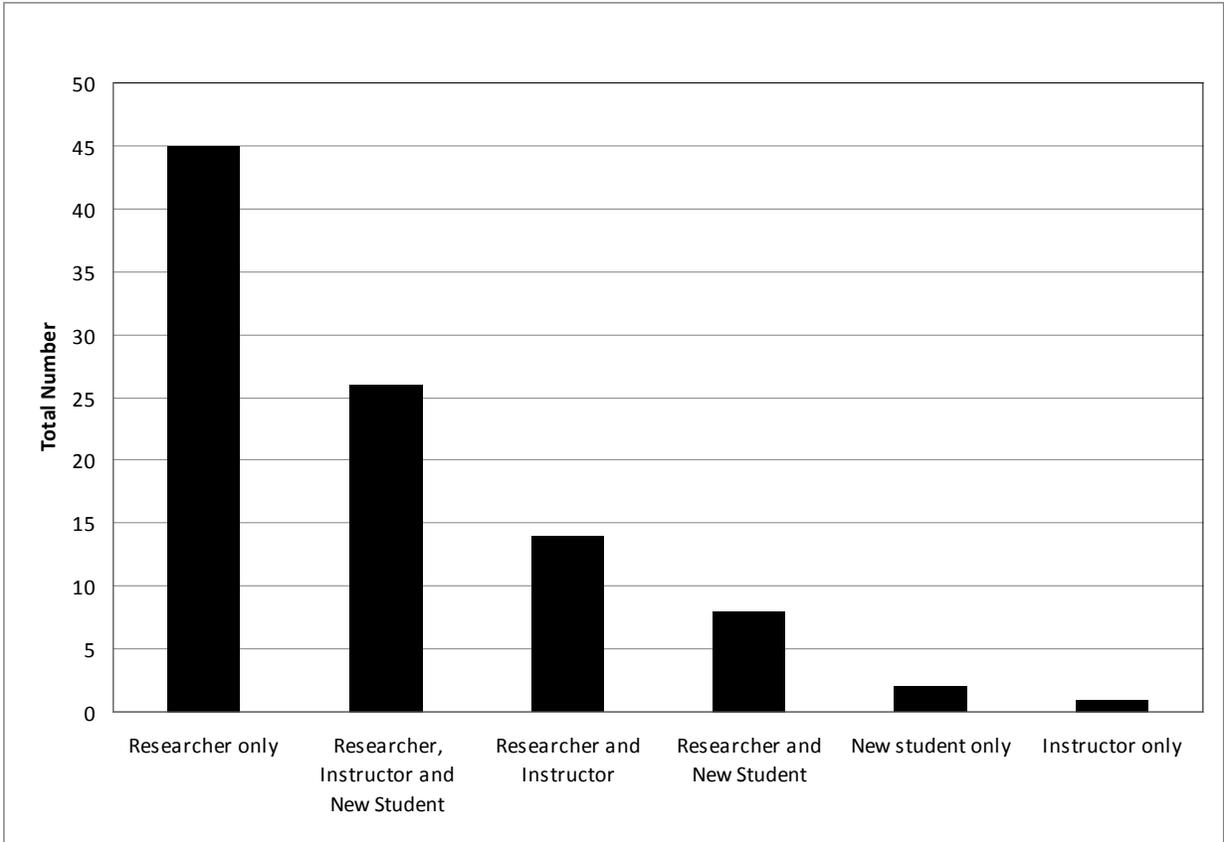| Programming Type	Percent of ARL Sites (Percent with Citation Management Information Only)
Events Schedule	56 (32)
Subject or Course Guides	54 (40)

Figure 1. The number of ARL Web sites with information for graduate students as researchers, instructors or new students.