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Services and Resources to Engineers: A Case Study of Outreach and Marketing, Assessment, and Future Directions in a Research Library

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Abstract

The literature, activities, and resource needs of engineering students and faculty provide insight into a demographic that is often among the early-adopters of new technologies, tools, and methods of sharing information. Despite the often non-bibliographic nature of their research efforts, there are numerous elements of the traditional service model that remain relevant and integral to the engineering research patron base. New methods of in-person and virtual instruction, the improved promotion of research consultation, and data management are prime targets for efficient and effective service updates. This article outlines the current engineering research environment, using a large research institution as a model and case study for evaluation and future planning for outreach and service marketing.

Introduction

The literature and research on the acquisition of knowledge by science and engineering students and faculty have demonstrated a number of clear and effective methods of outreach and library partnerships. Even the limited resources of a single subject specialist can provide advanced individual and group research services in concert with the requisite other professional librarian duties, such as collection development and library instruction. The focus of this article is the examination of the current promotion and provision of library research services to the science and engineering clientele, as well as a brief discussion on possible future improvements and applications.

Literature Review

Studies of information seeking behavior of engineers show us their current preferences and research practices. Hemminger, et al., at UNC Chapel Hill (2007) found that faculty in the sciences have largely transitioned to free and subscription electronic search engines for their initial approach to searching, especially Google Scholar and other meta-search tools. This endeavor was followed by a national and multi-institution distribution of the survey by Niu, et al., (2010) that found evidence that science researchers are heavily in favor of electronic means for searching and material delivery, but large-scale use of unified institutional repositories and other digital means of scholarly communication are progressing at a much slower rate.

Tucci (2011) investigated similar variables in the measure of research preferences and practices and noted the additional, perhaps unintended, importance of the study instrument as an opportunity to market library services and to collect data. This observation by Tucci emphasizes the importance of never missing an opportunity to assess and integrate the library's role, as well as that of the librarian, in the activities of science researchers and scholars. In much the same way, Brush (2010) used clickers to

evaluate the information needs of first-year engineering students following instruction, while also making library services and resources increasingly visible and highlighting the importance of early and repeated library contact with science undergraduates. Brush also assessed audience response methods with engineering students and more traditional library orientation efforts. The science instruction offered at the USF Tampa Library will be discussed as it compares to these published examples.

Nesdill, Love, and Hunt (2010) offered an excellent review of the fiscal and staffing challenges facing providers of reference, as well as their own story of success in serving the sciences through a formalized team approach within the library. They emphasize the need to coordinate public services to compensate for the reduced number of subject specialists. As with many libraries, staffing situations reported in their research led to a combination service-point approach; they described the move to a tiered system, allowing staff to respond to simple questions and referring up the chain to librarians and subject specialists for more advanced reference inquiries. They outlined the importance of unhinging from past service practices that have become impediments to progress. Lubker et al. (2010) discussed the concept of providing reference and research services in the halls and offices of the researchers, rather than waiting for them to visit specific libraries or librarian offices.

Hunter, et al. (2010), focused on the combination of service provision by the Information Technology (IT) department and Reference to support "the full research lifecycle" in serving their engineering and science faculty clientele. Oxnam (2010) emphasized other types of these collaborative service points among specialized science and engineering libraries, as well as the federal governments' efforts to harvest and efficiently disseminate Government Printing Office (GPO) and other technical information integral to university and academic research. These reductions in resources are commonly found in the literature, but the ability to improvise and create partnerships in information sharing emerged as another central theme.

Other inspiration comes from Nelson's 2007 article on engineering reference and information practices. This work provides an excellent survey of library activities related to outreach services, as well as documentation of projects initiated to establish satellite locations. Even in cases of unsuccessful efforts and innovations, much was learned and this, too, will be further discussed by reviewing similar efforts at the USF Tampa.

The Environment at the University of South Florida

The USF College of Engineering is relatively large, consisting of six departments, 2,992 undergraduates, 789 graduate students, and 176 faculty members (University of South Florida InfoCenter 2013). The goal of effective communication with this population necessitates the standardization of research service offerings, while simultaneously suggesting new and innovative resources to a population of researchers heavily focused on the immediacy of new data and publications.

There are over 700 electronic databases provided and managed by the USF Libraries and the USF Tampa Library. These resources are most commonly accessed by title, by subject using the MetaLIB system, or by the LibGuides designed specifically for engineering subject and course requirements. In the Engineering category, there are 83 online resources available, with further breakdown by type and/or subject content. Table 1 outlines current examples of the most popular USF resources in these areas and their levels of use.

Database name	Sessions	Searches	Full-text Downloads
ACS Publications – Vendor: American Chemical Society	26,431	11,218	49,875
Compendex (1884-) (Engineering Village) – Vendor: Elsevier	2,129	7,887	NA
IEEE Xplore – Vendor: IEEE	NA	28,632	20,247
ScienceDirect – Vendor: Elsevier	186,696	66,531	460,313
Wiley Interscience – Vendor: Wiley	8,918	NA	32,251
ACM Computing Reviews – Vendor: ACM	19,826	3,633	NA
Web of Knowledge – Vendor: Thomson Corp.	12,016	36,863	NA
SpringerLink – Vendor: Springer	NA	NA	47,722
IoP Electronic Journals – Vendor: Institute of Physics	3,118	N/A	2,556

Table 1

Use of all of these and other major electronic engineering resources is extremely high, which helps to justify the spending for research-level resources in a number of areas within computer and engineering research. The USF Libraries pays over $6 million annually for resources, including almost $2 million for the following list of databases (*USF Libraries Academic Resources Annual Statistical Summary* 2013). In addition to prudent proactive individual purchases, the USF Libraries leverage consortia buying with effective negotiation and the packaging of resources to ensure maximum product per research dollar. This information is also packaged and regularly disseminated to engineering faculty using e-mails, blogs, and other forms of communication. The librarians and staff are constantly refining and honing these messages, including the method(s) of delivery, in both individual and group ways. The staff includes an expert in marketing and development and this person is available for consultation and uniformity of message in the delivery of electronic messages and newsletters. This cohesive and organized effort allows for a common theme, but offers flexibility of emphasis for various programs and subject areas.

The provision of electronic journals, databases, and other resources is integral to all fields of research, especially for the engineering faculty and students. The USF Libraries have access to most major science and engineering databases, including a comprehensive journal and book package from the publisher Springer and the complete ISI *Web of Knowledge* database (which includes the *Journal Citation Reports*, *BIOSIS Previews*, and the *Web of Science* resources). Regularly scheduled collection of this statistical information using *WorldCat Collection Analysis Tool*, often for accreditation purposes, illustrates the relative strength of USF's electronic subscriptions compare well to those of the peer and aspirant institutions cited by USF and the College of Engineering.

The changes to the overall format and acquisition of collections have also been quite pronounced. A review of USF Library acquisition trends shows that in 2009-2010, 438,564 e-books were available to authenticated affiliated patrons, which represents a rise of 196% from the 2004-2005 total of 147,943 e-books in the USF Libraries collections. The numbers for e-journal collections are comparatively similar; e-journals from 2004-2005 totaled 23,986 titles and $1,560,804 in subscription costs and for 2009-2010, these figures rise to 77,884 titles at $2,881,439.53 (*USF Libraries Academic Resources Annual Statistical Summary* 2013). This is an increase of 225% in total number of titles and 85% in expenditures.

As with many other large academic institutions, the USF Library has participated in several administrations of the *LibQual+* survey, including the collection of data in February of 2011. The survey information provided by *LibQual+* is valuable across subjects and patron types, but it must be carefully used. In many cases, there was no simple way to isolate the results for Engineering respondents, but it was possible to make inferences on the needs of this specific population. Many of the patterns and measures that will be discussed in the following paragraphs hold true across disciplines, and may be cautiously applied to engineering faculty and their activities.

As evidenced by Hemminger, et al. (2007), and Niu, et al. (2010), there is a strong preference among engineering academics for self-discovery and for materials in electronic format. A particularly illustrative and brief example from *LibQual+* deals with the specific question "A library Web site enabling me to locate information on my own". This represents one of the highest of the desired mean questions in the Information Control (IC) component in the 2011 results for USF and for a combination of ARL respondents. When comparing graduate student populations, for example, these individuals at USF report a minimum expectation of 7.43 (on a standard scale of 1-9), they perceive a score of 6.95, and they desire an 8.56. These numbers result in an adequacy figure of -0.48 (Association of Research Libraries & Texas A&M University 2011a). The ARL population of graduate students is slightly more forgiving, but only by a small margin. They report a minimum expectation of a 7.09, a perceived score of 7.21, and a desired level of 8.35 (Association of Research Libraries & Texas A&M University 2011b). This results in an adequacy margin of +0.12, but the most important facet of this example is the similarity of these numbers across surveys and populations.

When looking at more of the IC elements in both the USF and ARL results, the patterns of strong demand for easy and independent research are similar and pervasive. This data points even more directly to a growing need for effective and intuitive individual access to materials, primarily in electronic format. These results provided an extra incentive for the renovation of the USF Libraries web site, as well as the coordination and evaluation of other forms of marketing to the Engineering and other research populations. Early usability testing and feedback have encouraged the library's web team to continue the efforts to simplify, improve, and update the site.

A final element of the current environment is a good look at the landscape. In 2009, all subject specialists in the USF Libraries prepared detailed environmental scans of the research efforts, publications, and grants of the faculty and other scholars. This project was initiated as a quantitative and qualitative effort to identify priorities in teaching and external funding to more efficiently direct library

efforts and resource dollars. Tables were created for each department to correlate LC call number classes to specific subjects, classes (both undergraduate and graduate), and areas of research and grant focus that were gleaned from student, faculty, and USF sites. Here is an example (Table 2) for the department of Chemical & Biomedical Engineering:

Class	Subject Area OR Topic	UG Courses	Grad Courses	Grad Topics	Faculty Topics	Gr Ar
QH573 - 671	Electrofusion/electrogenetheraphy (cytology)				2	
QP301 - 336	Biomechanics			1	2	
QP431 - 495	Human sensory processes/perception			1	1	
QP519.7 - 519.9	Electrophoresis				1	
R850 - 854	Biomedical systems/instrumentation			2	2	
R856-857	Biomaterials			6	3	
R856-857 and TA166-167	Biomedical engineering	1		7	1	
RC270.8 - 271 and RM260-263	Chemotherapy/Electrochemotherapy				1	
RD597 - 598.7 and WG (medical heading)	Cardiovascular mechanics/artificial heart			3	2	

Table 2

The College of Engineering used the data to focus on new electronic resources and possible targets for instruction and the data directed the library to specific faculty for further consultation on collection and service needs. The use of additional collection analysis and development tools, such as *WorldCat Collection Analysis Tool* and *Goldrush*, allowed the identification and purchase of resources related to these and other specific areas of research centralization. This led to an expansion of the collection in the fields of Engineering Education, which appears on several department lists, as well as a variety of other topic and call number areas, such as Image Processing, Pattern Recognition, Artificial Intelligence, and Computer Vision.

These areas also emerged as the topic research clusters and areas of emphasis for grants and faculty effort. After identifying peer and aspirant institutions, both inside and outside our current consortia units, comparisons of book and journal holdings allowed for the easy identification of core collection additions, as well as those more unique items necessary for distinct research areas. With fewer funds available for proactive collection development, making sure that new titles are relevant to the key research topics and personnel is of the utmost importance.

Existing Outreach & Services at the USF Tampa Library

As with most libraries, especially a large and general academic library covering a wide variety of subject areas, there are many standard methods employed to promote new and existing research services and collections. In the USF environment, changes in general reference scheduling and resources have resulted in reduced general hours of on-call reference services at the physical library locations. The positive impact of these changes was the opportunity to apply these additional available hours of effort to new and innovative virtual reference services, all types of instruction and consultation services, and new modes of outreach and communication with the clientele. A number of individual forces were also affecting these changes, including staffing levels, statistical evaluation of service points and resource use, and *LibQual+* and other environmental scanning endeavors.

Another interesting trend was the rise in individual research consultation requests for engineers. The two sets of data in Table 3 represent various methods of contact and categories of research need for the month of September 2010 (our busiest month in the Fall semester) and September 2011. The 2010 data was collected just prior to the implementation of a new and updated library web site, which improved the visibility and availability of USF Library research services through more prominent links, blogs, and other methods of online communication and marketing to faculty and students. The second set of numbers represents the comparable data for September of 2011, following the launch of the new site and the concurrent promotion of the more numerous and accessible library services.

September 2010 - Contacts/Consultations: 233
Top methods of contact:

1 = 103 (44%) Face to Face

2 = 70 (30%) Phone

3 = 60 (26%) E-mail
Top categories for purpose of contact:
1 = 33 (37%) Basic Reference Assistance
2 = 16 (18%) Advanced Reference Assistance/Research Consultation
3 = 12 (13%) Instructional Support
4 = 11 (12%) Vendor Communications
September 2011 - Contacts/Consultations: 174
Top methods of contact:
1 = 86 (49%) E-mail
2 = 62 (36%) Face to Face
3 = 26 (15%) Phone
Top categories for purpose of contact:
1 = 39 (39%) Basic Reference Assistance
2 = 33 (33%) Advanced Reference Assistance/Research Consultation
3 = 10 (10%) Vendor Communications
4 = 6   (6%) Instructional Support
Table 3

The combination of dramatic improvements to the library web site, better design and testing, and additional prominence of the virtual and personalized services on this upgraded platform suggested a positive influence on the ability of clients to be self-sufficient and find their library subject expert. The total number of interactions between USF affiliates and the engineering librarian was reduced by 25%, but this may have been partly due to a reduction in the overall number of hours spent working at standard reference and service desks. The number of research consultations during this same period rose by almost 100%. Enhancements to the organization of the site, the continued standardization of subject and course pages, and other planning and usability testing appear to have positively affected the availability and value of individual research assistance services, as well as the use by the science research community.

The preference for mode of contact over this time period also demonstrated a dramatic change. In terms of staffing, individually assigned librarian desk hours in 2011 were reduced by an average of 15-20%, which does account for some of this statistical change. It is likely that this is evidence of the desire for virtual assistance and, as hinted in *LibQual+* results, further development of the increasingly self-sufficient faculty researcher in these subject areas. With more and more of the advanced research clients using the increased e-mail, chat, and other virtual reference services, or contacting their subject specialist directly, there are more available resources to better serve the needs of comprehensive and subject specific populations with other virtual reference services. The USF Libraries offered extensive and responsive e-mail, chat, and other virtual modes of communication. The addition of links to the branded "Ask-A-Librarian" electronic reference services, along with the additional hours of service gained by participating in an academic chat collaborative, warrant intensive future planning and assessment.

Instruction, LibGuides, and Other Measures

There were over 26 instructional sessions performed for courses in the College of Engineering in 2012-2013, including undergraduate and graduate classes, and this is generally indicative of the annual demand for library instruction from the various engineering departments. In addition to these individual class sessions, the library partnered with other USF groups to provide science and citation management workshops and other helpful information and research sessions. Demand tends to be heaviest in particular core courses, a specific example of which is detailed below, as well as in certain fields of engineering.

The class titled *ENC 3246: Communication for Engineers* provided an opportunity to survey the students about the current and future professional value of information and information literacy. With multiple sections of this required class taught every semester, this represented an excellent opportunity to assess the needs of a current audience of students, some of whom will make up a future audience of faculty and industry clients. While these surveys are rough and informal in nature, the aggregate value (140 survey participants over the last two years) has provided ample discussion and assessment data for the core instructors teaching this class. A goal for the near future is to create a more formal program that extends the library and librarian relationship beyond this single class. The numbers in the following paragraphs will outline many of the successes of the instructional and virtual approach to a large portion

of the undergraduate engineering student population. Making sure they return to the library for additional information service and access remains a challenge to execute and to measure.

The content of the survey was a simple seven-question instrument asking participants to estimate their pre-session library skills, assess the level and content of the session, and comment on areas of the workshop in need of improvement or clarification. Over the first two years of consistent survey administration, there have been very few open-ended comments, but extraordinarily high levels of response. The likely reasons for this are numerous, but the obvious cause of response success is the encouragement (and just short of requirement) of the instructors in getting their students to complete the instrument. The short nature of the survey, combined with positive reinforcement for completion, aid dramatically in the collection of the data. A small change was made in the second year of survey administration and this allowed for more time to complete the survey. The additional time and explanation have assisted in the collection of more useful commentary by an increased number of survey participants.

After discussion with the various instructors, the administration of the survey is now performed closer to the end of the semester and directly following submission of their final written product. There's more data to be collected and evaluated, but the early returns are positive. This will remain difficult to objectively quantify, but the acknowledgement of library value by this group of engineering undergraduates is a positive sign for this type of teaching and marketing effort. Each issuance of the survey has resulted in extremely positive impressions in terms of session value. The collected responses for all semesters demonstrate over 90% of the participants indicated their research skills had improved as a result of the session. These figures further support the value of collaborative instruction in one or more central and/or required undergraduate and graduate class sessions.

The ability and occasion to contact second and third-year engineering students at a relevant point of need is critical. A majority of instructors for this course follow a standard curriculum and the program coordinator has afforded the library the chance to select and integrate resources into a LibGuide specific to this course. A link to this page was added to the *BlackBoard* portal for almost all sections. The ability to affect the syllabus, the types of tools and instruction afforded to the students, and the chance to assist engineers in a traditional (i.e., secondary and bibliographic) manner helped plant the seed for graduate and professional use of library resources and advanced services.

LibGuides were also a great help in the simple and efficient estimation, at least in part, of the impact of both group and individual library instruction. The LibGuide created specifically for ENC 3246, the most likely course for an engineer to receive library instruction, has been used, assessed via survey, and updated every semester following its launch in the fall of 2009. This online course guide demonstrates high overall use and has tested well with several cohorts of students and instructors. With 1,008 hits in 2010, 1,137 in 2011, and 1,520 in 2012, it's among the most consistently used course guides on the USF site and the numbers are on the rise. It's likely that those attending class sessions are producing the majority of these numbers, but student contacts and faculty feedback have provided evidence that instructors teaching multiple sections of ENC 3246 are heavily promoting the use of this guide to their students. There have been many documented cases of direct communication from participants these courses, as well as contact from course participants at other USF campus locations that are not receiving direct library instruction.

Despite e-mails to faculty, blog announcements, and other marketing efforts, the general engineering subject guide has garnered 1,252 hits in 2012; a bit fewer than anticipated based on the population that should ideally be interested in using this page as a research starting point. As a point of comparison, the College of Education counted a total of 3,279 students (compared to 3,784 in Engineering according to USF's *InfoCenter*) and the main LibGuide for this college received 12,489 hits. There was far more embedded librarianship and instruction going on with the College of Education, but there remains a strong desire to get the demonstrated use of this Engineering gateway a bit higher. And while the current numbers are not exactly great news, it showed increased use of library resources with the direct connection to classroom assignments at the undergraduate level. With the complete list of engineering databases also available via our master list on the MetaLIB platform, it's possible that some students and researchers were missing the value in these subject and course portals. Where holes and failures were made visible, it simply means marketing opportunities await.

The use of LibGuides and the redesign of the web site to enhance the visibility of new marketing initiatives have proved an invaluable tool in the battle to maintain a high ratio of value to effort. The addition of a new and experienced individual for the development and coordination of the library site brought not only an increase in available technical skills, but also observations from the outside/corporate world. This input further enhanced the organization, design, and visibility of the subject and course LibGuides in the new 2011 version of the USF Libraries web site. As evidenced by increased overall traffic to the LibGuides, the new design has allowed for better discovery of the

engineering and other subject portals. The previous site exhibited far less overall standardization and developmental usability testing, as well as less formal organization and guidelines for the creation and development of subject and course pages using the LibGuides platform.

Other important areas of instruction and outreach include graduate and new faculty orientations, which were often easy opportunities to promote new databases and service initiatives. It's also common to use the role of collection liaison to gain contact with the faculty and insight into their research. Identifying areas of crossover with engineering, or new clusters of research formed with interdisciplinary faculty, is another approach to consider when courting new populations for research services. At USF, these areas are identified by new classes, degrees, and research centers in areas that overlap with science and technology and include the programs of entrepreneurship, medicine, public health, and more. Many of these clients are traditional and existing library users, but these new and hybrid programs represent another great chance to sell the library and its professional information services. These simple acts of additional communication, as well as the ability of these faculty groups to directly express research and collection needs, may be used to spread the word about available library expertise.

Piloting & Assessing New Methods

Throughout the academic years 2006 and 2008, the USF Tampa Library and several of the librarians, embarked on a pilot project to provide on-demand reference services to students and faculty outside the library walls. The statistics, even if slightly dated, still tell an interesting part of the tale, but it remains hard to qualify these efforts as a comprehensive success, or failure. Despite initial benefits in the form of serendipitous faculty and student contacts, asking librarians to provide two to four hours of weekly on-site reference services was received with mixed results. While Lubker, et al., (2010) were able to employ this model and enjoy success in the specialized medical library environment, efforts to reach out from a large multi-disciplinary library to locations in the buildings of the College of Art, the Natural & Environmental Sciences, and Engineering were not as productive.

The USF pilot of this service was launched in early 2006 and continued through to the end of 2008. The Spring 2007 semester was the busiest for the service point at the College of Engineering, but still yielded only nine complex and 12 simple inquiries over a total of 28 service hours for the term. At less than one question per hour, the project was eliminated and these efforts turned to other points of focus, such as virtual reference and on-call consultation services. Despite low use, there may have been benefits to this attempt, even if only to help break the librarian stereotype. In the case of providing satellite reference stations, the gains were small, but educational. This program was not particularly successful in creating demand, at least at this institution and the locations attempted, but there was some serendipity associated with geography. especially in terms of faculty interaction which lead to new contacts for instruction, research guidance, and collaboration. The satellite service was halted in 2008 allowing the USF Libraries to move forward with other more effective marketing and promotional efforts.

Blogs are another common tool employed by subject specialists at the USF Libraries in a variety of news and scholarly applications. From 2008 to 2011, this author contributed heavily to the content and dissemination of the *STM* (for *Science, Technology, and Mathematics*) blog created by colleagues to serve the combined populations of the sciences. It was, in the early days, updated regularly with content useful to all areas science and engineering faculty and students. While well designed and heavily publicized via e-mails, word of mouth, signage, and various other means, the usage statistics for this virtual publication never reached that of its counterpart efforts in the College of Education (the *EdLib Report*).

As the hits trailed off, so did the frequency of update and, consequently, the value to the engineering scholar. This author's own efforts to create a regular audience through e-mail blasts, signage in the college, and direct communication to faculty were ineffective, but the passage of time has inspired another try.

The availability of new and more effective blog and electronic dissemination platforms, enhanced technical assistance, and increased promotional expertise through more organized communication efforts prompted the USF Tampa Library to take another swing at blogging in the sciences and other subject areas. A new engineering missive, titled The Library Engineer's Report, was launched in October of 2011. The use of the WordPress platform, better web design, and content management and message coordination by a new library web master should prove to be beneficial to patrons. As with the work of Niu, et al. (2010), this researcher found this form of informal scholarly communication to be of only minor impact, at least based on the early returns. The total number of unique page views for October 2011 to July 2013 was 278; there is potential for more investigation into the efficacy of blogs as a means of effective information exchange with science faculty.

Joint vendor-library workshops are also underway at the USF Libraries and in October 2011, the USF Tampa Library featured several *IEEE Xplore* workshops co-hosted by both corporate representatives and librarians. These sessions are interesting not just due to their collaborative nature, but due to the fact that the sessions are being marketed to engineers, artists, and other multidisciplinary areas of the university. Many of the databases and other resources listed under the heading of engineering have much to offer other researchers and there is a great deal the engineering scholar can glean from using databases outside their subject designation. Crossover use and marketing of these new and increasingly subject-blended materials will also be of utmost importance.

Conclusions and Future Planning

The relative successes and moderate failures described above have all been beneficial to the current and future marketing and dissemination of new engineering resources and research services. The literature and *LibQual+* survey results have demonstrated a strong preference for the electronic searching and delivery of research materials, which is serendipitously encouraged by the changing structure of collection development. With reduced discretionary funding available for proactive purchase and acquisition, making sure what is purchased gets used and what is needed gets purchased is of the utmost importance. Continued development of new modes for the electronic marketing of resources and services is a given, but on the horizon are additional opportunities for automation and collaboration.

At the USF Tampa Library, plans are in place for additional automation in collection building and the delivery of reference services. The staff in the Academic Resources department has implemented a purchase-on-demand system for identifying and acquiring new monographic materials. By partnering with the vendors, plans have been implemented that act behind the scenes to bring patrons the books and other items they need. This is a strong benefit to engineering patrons, as they tend to be among the academic populations most interested in self-sufficiency and electronic access (Niu, et al. 2010). The USF *LibQual+* results for 2011 demonstrate that faculty and graduate students, the two largest research populations, place a large emphasis on "A library Web site enabling me to locate information on my own". The library is still showing a deficiency in this area for both populations, at -0.53 for faculty and -0.48 for graduate students (*LibQual+ Survey: University of South Florida* 2011). With the further evolution and development of SFX, as well as the future consideration of a discovery tool and improved federated searching, these numbers should improve by the next rounds of library assessment.

Rather than attempt to predict the direction of research collections using approval plans and predictive purchases, the relevant populations in science and engineering will be able to guide the collections with their research needs using these and other traditional services, such as interlibrary loan and direct request of new materials. In conjunction with Google Scholar, the only drawback to these increasingly seamless finding aids is that the users often don't seem to know that the library is involved in the wonderful list of resources that are quickly and magically accessible. As previously documented by Hemminger, et al. (2007), and Niu, et al. (2010), this type of expanded meta-search is directly in line with the preferences of researchers in the fields of science and engineering.

On the service end, there are also plans in place for new and innovative research assistance and the marketing of new resources available using the aforementioned blogs, library workshops, and web site development. A new set of basic, advanced, and subject/resource specific library workshops are currently being piloted under the name "Research Rescue". These sessions are offered in both physical and virtual (Elluminate) settings and cover a variety of subject and resource areas, including Engineering, citation management, and vendor/library partnered workshops. While in the early stages of development, initial offerings have been well received by engineering students and faculty. Marketing of the first set of sessions has been cautiously effective, with over 42 students, faculty, and other researchers attending the voluntary advanced library sessions covering offered specifically to the College of Engineering. As stated above, improved means of communication and message delivery stand ready to further improve these statistics and the library's rate of return on marketing efforts.

Other items on the horizon include plans to automate the inclusion of subject and course LibGuides into the *BlackBoard*/CANVAS course mechanisms. Work is currently underway to partner with IT to ensure the effective and efficient management of mapping these relationships. This will benefit the engineers in multiple ways, especially with the ability to centralize access to library resources in a virtual spot where authentication has already been established. Further review and enhancement of the site is also a major part of any future planning efforts and will additionally benefit the marketing of new services and resources. The establishment of focus groups is currently underway to better collect information and serve the engineering scholar.

The final points of focus for the improvement of outreach and marketing to science and engineering patrons involve stressing the importance of library partnerships and collaborative efforts. As mentioned

above with IT and course shell efforts, the library resources and staff must continue to prove their relevance and value. Colleagues at the USF Libraries are at work creating and marketing a new institutional repository and mode of data management to help cement a university-wide niche for the library in this arena of scholarly communication. By cultivating partnerships with other educational units, such as Tutoring & Learning and the USF Writing Center, the USF Libraries will continue to increase demand for value-added information services for engineering and other research clients.

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