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# Fostering Information Fluency: Two Student Centered Initiatives

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## Abstract

Two initiatives have been undertaken at Carnegie Mellon University, one to address issues of accountability relative to information literacy and the other to learn more about graduate students' information gathering behavior. In response to changing accreditation requirements, new evidence for student learning is being required. Thus a program to concentrate on the information literacy skills of undergraduates, particularly in major fields of study, has been started. The other initiative focuses on understanding the current information gathering behaviors of graduate students. Outcomes from this study are being incorporated into services directed at graduate students. Questions about how to address these needs from an operational perspective and their potential on library staffing are noted.

**Keywords:** information literacy; information seeking behavior; library management.

## 1 Introduction

Many libraries promote the metaphor of the library as the heart and soul of the university. The metaphor may be valuable for fundraising with alumni and friends of the university but that sentiment alone will not ensure that libraries remain relevant in a fast-changing, quick-paced Googlized world. Today libraries have sought to update facilities with expanded computing labs and learning commons. Technological tools and software that allow for self service and greater student autonomy have been embraced. Improvements to the physical environment with better and varied seating options combined with amenities such as cafés enhance the ambience of library. These changes and additions as welcome as they may be do not address the central issue about how students gather information and use it in writing and learning.

Various factors have influenced the libraries' interest in exploring how students find and use information for reading, research and course assignments. They include:

- Changing standards of accreditation organizations
- Feedback from faculty about student preparedness and performance
- The development of university programs to support undergraduates.

- Carnegie Mellon Library Advisory Board visit

To better understand the impact of these factors, each factor will be briefly explained. University and colleges in the United States, both public and private, must be evaluated by an external body whose function is to assess institutions of higher education and determine whether the institution is meeting the goals they have established. The accreditation body for Carnegie Mellon University is the Middle States Commission on Higher Education. The outcome of their review is the accreditation of the institution. The goals of the commission are to promote and ensure quality in the institutions they review. The review draws on established standards of measuring success. For example in libraries, they have measured inputs such as size of collection, number of circulations and the like. More recently, the Middle States Commission on Higher Education has recalibrated their measures for determining academic success. [1,2,6,7,8] No longer are input measures the sole determinant. Learning outcomes and demonstration of information fluency are two examples of the new measurements.

Librarians who work closely with faculty have heard the concern that students are poorly prepared to evaluate critically what they read and then to use the information. The faculty perceive that the convenience and ease of the web encourages some students to think less rigorously than desired. For some unsophisticated or novice users, assumptions about the breadth of the open web may lead to superficial searching and thus less scholarly readings. Faculty are concerned that students do not have a well grounded understanding of scholarly and scientific resources and have turned to the library to help in addressing this matter. This issue has reached a point of high visibility and concern when a feature in the New York Times Op-Ed section editorializes on the impact of the web on students. [14]

At universities in the United States, university administration seeks to improve the undergraduate experience, both educationally and socially. Support programs exist to help the student learner. Student living spaces are often remodelled and new construction is built with student comfort in mind. First-year student committees are formed to address student concerns about academics and life experience during their first year in residence. On the academic side, the libraries offer in-class instruction in traditional first year courses primarily in a first year English course, Interpretation and

Argument. In-class instruction in other courses is made at the invitation of the instructor or professor. These factors – faculty dissatisfaction, changing accreditation standards, and limited opportunities to address students about information gathering – resulted in the libraries initiating a new program to address undergraduate information literacy.

The university libraries is reviewed on a five-year cycle through an advisory board process. [4,5] In preparation for the 2004 Carnegie Mellon University Advisory Board for the university libraries, the library prepared a briefing book to inform the visiting team about the progress of library initiatives and challenges that the library faces in undertaking its mission. In the process of creating the briefing book, a fresh analysis of the undergraduate learning experience was featured as well as concerns about graduate student research behavior.

At the same time the libraries were reviewing how undergraduate students were served in conjunction with the impending advisory board visit of 2004, a similar analysis about graduate students and faculty was made. It was observed that graduate students were less well served by the system in place. The university has formal mechanisms to support undergraduates. Faculty have a more developed network of colleagues and friends on whom they rely as part of an information network. It was from the confluence of these factors the library asked whether graduate students were at a disadvantage in this environment. Given the modest size of the university library, we were uncertain about how the contemporary graduate student sought information within the Carnegie Mellon environment. From these factors and realizations, the library took steps to investigate the problem and to explore solutions.

## **2 Addressing undergraduate needs**

The libraries have a well established history of supporting the writing class, Interpretation and Argument, typically a course taken by all undergraduates during their first year. Knowing that faculty had expressed concern about the proficiency of the undergraduate students and knowing that the next accreditation visit of the Middle States Commission on Higher Education in 2008 would be looking for information literacy outcomes, the libraries sought to understand how the library could better engage the students. The director of the information literacy program embarked on a series of meetings with the academic department chairs (or a faculty representative or other designated faculty member) and the library liaison (Fourteen librarians provide liaison services to twenty seven academic departments; services include reference, collection development and instruction.) The purpose of the meeting was to engage the academic department in a discussion about needs and perceptions. Rather than focusing on library instruction for introductory, first year courses, the discussion centered on higher level courses in the major field of study.

The dean of university libraries along with the director of the information literacy initiatives secured funding from a local foundation to support a two year program to address

information needs of upper division students in their major field and to share the results of the program with the broader academic community. The goals of the program are to:

- “Complete the campus-wide assessment of information-literacy resources and needs.
- Develop information-literacy curriculum modules applicable to disciplines in the arts, humanities, social sciences, business, engineering and natural sciences.
- Meet and exceed Middle States accreditation standards for information literacy.
- Strengthen partnerships in the local consortium and cultivate new, mutually beneficial relationships with additional academic and public libraries throughout the regions.
- Hold information-literacy workshops and seminars for partner schools and libraries and provide organizational support for conducting assessments developing curricula of their own.”

The new program will build on an existing required workshop on computer skills and address issues related to the understanding of how to find information and how to use information. It will also build an understanding of legal, ethical, economic and social factors related to digital information. To assist in the program, the libraries were able to hire an information literacy fellow to assist in the daily operation of the project.

This new initiative differs from previous information literacy activities in that this program specifically targets upper division students in their major field of study. Under the leadership of the director of information literacy initiatives strategic partnerships on campus have been developed and strengthened. Key connections to the Vice Provost for Education and the University Education Council have been established. The University Education Council is a key forum where undergraduate student concerns area addressed. By working closely with the Vice Provost for Education the libraries have been able to promote this new direction for information literacy targeting upper level undergraduates.

In the fall of 2006, prototypes in several fields will begin in the classroom. At this moment, these are slated for architecture and an engineering department. Also in the fall 2006, we will begin working with the Carnegie Mellon Entertainment Technology Center to develop computer based modules for information literacy in specific fields by using game technology and interactive techniques and technologies.

## **3 Examination of graduate student information seeking behaviors**

A team of librarians developed a project to investigate the practices of graduate students in seeking information. The survey was designed to elicit qualitative data about how graduate students sought and used information. Part of the team included the libraries’ human factors researcher so that her expertise would help shape the survey and inform the

interview process. The team consulted with the campus teaching center which had recently completed an extensive survey using similar interview techniques that the library survey would use.

To begin the project a brief survey was initiated to help develop the questions to be used in an in-depth survey. Rather than relying on a web based survey for the project, the libraries chose to conduct a series of taped interviews with graduate students. The initial pool of students was randomly generated. To ensure representation from all colleges and from both master's level and doctoral students, additional students were recruited to fill gaps in the pool.

	Student Sample		Total
	Master's	Doctoral	
Arts & Architecture	12	4	16
Business & Policy	10	1	11
Computer Science	2	12	14
Engineering	7	19	26
Humanities	5	15	20
Sciences	0	13	13
<b>Total Students</b>	36	64	100

Table 1: Demographics of students in study

Over a series of months, the project team taped interviews with users following a set script of questions. (See Appendix) Interviewers were free to follow up on replies with unscripted questions. This technique allowed the students to clarify and amplify their responses. Following the interviews, each interview was professionally transcribed. The team used software (Atlas.ti™) to help in the analysis of the transcripts. Team members coded the transcripts, with two individuals coding each transcript. This double coding allowed for consistent analysis and reliability.

The survey revealed where and how graduate students sought information. Important to them were personal contacts with faculty, advisors and fellow students. Tables 2 and 3 show how extensively the survey participants relied on these contacts for both recommendations about what sources to consult but also for sharing actual papers, books and articles. Through the survey, graduate students told us that professors and advisors were crucial to finding information relevant to their research and study.

	Help from Professors & Advisors	Received Recommendations	Received Resources
Arts & Architecture	94%	56%	69%
Business & Policy	100%	55%	36%
Computer Science	86%	50%	71%
Engineering	100%	69%	62%
Humanities	95%	75%	60%
Sciences	100%	77%	39%

Table 2: Academic Help

Students reported during their interviews that they often looked to fellow students for information. In seminars, class discussions and meetings outside of class, students share information about important articles and refer each other to articles of interest and perceived relevance.

	Help from Fellow Students	Received Recommendations	Received Resources
Arts & Architecture	62%	31%	38%
Business & Policy	82%	45%	1%
Computer Science	71%	43%	35%
Engineering	73%	19%	31%
Humanities	80%	40%	25%
Sciences	69%	38%	38%

Table 3: Help from fellow students

Relying on the library as a first source for initiating research did not fare as well as personal contacts such as faculty and other students (Table 4). Graduate students reported that the hours of reference and chat services do not coincide with the hours when they are typically engaged in research. During the day they are often busy attending or teaching courses. They engage in their research late at night when service points are closed. The interview questions did not ask specifically about personnel. In general comments, graduate students volunteered the opinion that they valued librarians, especially the library liaison to their academic department. Many praised library staff of all ranks and library services.

	Help from Library Personnel	Help from Outside Contacts
Arts & Architecture	44%	1%
Business & Policy	72%	0%
Computer Science	29%	43%
Engineering	15%	27%
Humanities	55%	20%
Sciences	46%	8%

Table 4: Help from library and outside contacts

Students used the web as a first step when beginning research. The web is their resource to find answers to simple questions, to find general information and to locate research papers and studies from author's web sites. Table 5 also reports how students' perceptions about the web. Many of those interviewed did not find the web to have poor or unreliable information.

Web use	First step; primary method	Convenient	Poor
100%		Fast Easy	Unreliable Information
Arts & Architecture	62%	31%	25%
Business & Policy	91%	45%	27%
Computer Science	79%	46%	0%
Engineering	88%	77%	2%
Humanities	75%	50%	30%
Sciences	62%	46%	15%

Table 5: Using the web

Graduate students were asked about how important the library was for their work and how they used it (Table 6). For many students the libraries and its online resources are important to their research. At the same time, they reported in interviews that they were often overwhelmed by and impatient about the number of databases and online resources. Some found the library web site to be confusing. During the interviews, students recalled being introduced to library services and databases during their initial orientation when they first came to the university. They were unaware of later opportunities to learn more about library services and how best to use library resources.

	Library web use	Use library databases	Use online journals - full text databases
Arts & Architecture	79%	50%	19%
Business & Policy	100%	82%	55%
Computer Science	79%	71%	79%
Engineering	96%	88%	77%
Humanities	100%	95%	74%
Sciences	92%	69%	46%

Table 6: Using the library online

Graduate students prefer the online ease and convenience of library resources online. In the interviews students remarked that access to more online journals and online journal backfiles were desired. Nonetheless, today there continues to be reliance on the library as a source for books and print journals (Table 7). As more materials are reformatted for online delivery and as more materials are born digital when first published, we might anticipate changes in the need for the physical library.

	Physical Library	Books	Print Journals
Arts & Architecture	100%	94%	50%
Business & Policy	77%	91%	54%
Computer Science	93%	86%	57%
Engineering	85%	81%	54%
Humanities	65%	95%	80%
Sciences	77%	85%	85%

Table 7: Using the library onsite

## 4 Conclusion

These two initiatives are part of ongoing efforts to mesh the library more deeply into students' education and to alter the perceptions about the library and its role. Both these initiatives form a basis for changes to current practices and establish a foundation from which to benchmark future assessment efforts and service enhancements. New measures of institutional accountability call for an examination and reassessment of current practices and services in libraries. Adding value to the student learning experience and understanding the perceptions students have and the practices that students use when conducting research challenges

libraries to deploy new techniques and methods to weave the library into the fabric of campus learning and research.

As we consider bolstering efforts in improving students information fluency and as we address what we are learning about graduate students' information seeking behavior, we are faced with questions about how best to align library services with user needs. These initiatives and studies challenge current practices and raise questions about how to address those needs and related service and collection issues.

Will our efforts with undergraduate students meet the standards of the accreditation agency? Will emerging evaluation and assessment tools such as SAILS provide meaningful evaluation [12]? What is the best way to measure and assess undergraduate information literacy outcomes in specific disciplines? Will developing an online information literacy tutorial targeted to specific disciplines be successful if delivered through an interactive game? To successfully deliver on information literacy, how should libraries structure their reference services? Currently our reference librarians are responsible for reference (specialized and general), collection development, instruction and liaison to academic departments. Should we develop different models to deliver these services to the campus community? How best to organize limited staff?

The reliance on search engines as the first place to seek information and the confusion that graduate students experience with library web pages is instructive. How should librarians capitalize on the phenomenon of the search engine? Many of our present practices are linked to a model of information discovery that is evolving. What measures do we take to be responsive and relevant? Can we relinquish our ties to past practices and seriously consider how best to meet student needs?

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## Appendix: Graduate Student Survey Questions

1. Tell me about your research interests, what research have you completed or plan to complete? What kind of materials have you used or do you plan to use? Where do you find these materials?
2. Describe how you go about finding appropriate materials?
3. What role does the Internet play in finding your research materials? Tell me more about this.
4. How useful to you are professors and fellow students for obtaining materials? What kinds of materials? How often?
5. Tell me whether and how you use the University Libraries' online resources. If NO - Why not? If YES - How convenient is that? Do you bookmark databases or journals or do you access these through the libraries' Website?
6. Can you describe the importance of the University of Pittsburgh libraries for your research in terms of traditional materials like books, journals, and microform? For electronic materials? Will their restrictions on the use of their electronic materials affect your research?
7. How reliant are you on interlibrary loan to obtain needed research materials? How does ILLiad work for you? How does EZBorrow [formerly PALCI] work for you?
8. How do you distinguish between searching for and obtaining materials?
9. What role does the University Library play in your research or educational work?
10. How could your information seeking or obtaining experience be improved?
11. Is there anything you would like to add?