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Incoming Graduate Students in the Social Sciences: How much do they really know about Library Research?

Amalia Monroe-Gulick, Social Sciences Librarian, University of Kansas, almonroe@ku.edu
Julie Petr, Social Sciences Librarian, University of Kansas, jpetr@ku.edu

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Academic librarians provide information literacy instruction and research services to graduate student. To develop evidence-based library instruction and research services for incoming graduate students, the authors interviewed 15 incoming graduate students in the social sciences and analyzed the interviews using the Association of College & Research Libraries Information Literacy Competency Standards for Higher Education (ACRL Standards). This article discusses the findings, including the authors' assumptions of student information illiteracy, trends noted during the interview analysis, and implications for delivering information literacy training to graduate students in a group discussion modality.

Introduction

The academic library serves a diverse population of users, from incoming freshmen to graduate students completing dissertations, to faculty creating and disseminating knowledge within their disciplines. As academic librarians, we strive to assist with the research process at every level. The genesis of this research project was the authors' desire to create evidence-based library programming for graduate students. The authors identified few articles in the professional literature that focused on the library research needs of incoming graduate students. This is a population that is often overlooked in library instructional programming, much of which focuses on teaching basic research skills to the undergraduate. Providing an appropriate level and focus of library instruction and support for new graduate students should be based upon information that identifies incoming strengths and deficiencies.

The authors implemented a user-centered approach to explore the needs of this population at the University of Kansas (KU) by analyzing data supplied directly by incoming graduate students. This research project investigates graduate students' research competencies in social sciences disciplines through three exploratory projects: interviewing incoming graduate students, identifying faculty expectations of incoming graduate students, and piloting a class for incoming graduate students based on initial findings. This article presents the results of the first exploratory project.

 The research question was: how do incoming graduate students in the social sciences at the KU conceptualize and implement the research process at the start of their graduate careers? The interviews were analyzed and compared with established information competencies from the Association of College & Research Libraries (ACRL) to identify discrepancies and gaps in the students' knowledge of the research process.

The research was originally presented at the Association of College & Research Libraries (ACRL) 2011 National Conference and a paper was included in the conference proceedings. In the current article, the authors expand upon the ACRL conference proceedings by enhancing the discussion of the project methodology to include the challenges encountered in recruiting participants, limitations in the research design, and the difficulties in applying each of the five ACRL Standards. [1] Additionally, the authors add to the results section to include information regarding the impact of the size of the undergraduate institution on the students' existing research skills. Additional trends that were identified during the analysis phase, including information saturation, the impact of students completing an undergraduate senior project or thesis, and information gleaned as students described their research and writing processes are

also discussed in the results section. Finally, the authors elaborate upon possible topics for library instruction delivered in a group discussion setting.

Literature Review

The selected articles discuss current research on the information seeking skills of graduate students and the delivery of library services to this user group. While the articles describe research that focuses on the needs of graduate students, including the development of research skills workshops, none of them identified trends discussed in this article such as academic socialization.

Blummer provided an historical overview (from the late 1950s to 2009) of library instructional programs that focus on graduate students.[2] The results concluded that much of the programming directed to this user population focused less on the acquisition of research skills and more on teaching about the organization of information. George and Bright, et al., investigated the information-seeking behaviors of one hundred masters' and doctoral students who were enrolled in six disciplinary areas (representing all colleges and departments) at Carnegie Mellon University. [3] Implications were drawn for library services such as developing finding aids that support accessibility to library resources. The authors also concluded that working with academic staff to increase awareness of library resources would benefit graduate students, who are heavily influenced by the suggestions of faculty and advisors. Washington-Hoagland and Clougherty reported the results of a University of Iowa Libraries' needs assessment survey that was administered to a random sample of graduate and professional students.[4] The survey sought to identify how graduate and professional students use the Libraries' resources and to determine unmet user needs. The authors described short-term and long-term goals that were implemented as a result of the survey responses.

Remple and Davidson discussed the development of library programming for graduate students at Oregon State University.[5] This library programming focused on offering literature review workshops across disciplines. The authors presented various topics covered in the workshops and noted that opportunities for the graduate students to meet in small groups to discuss their various research processes and strategies were quite valuable. Hoffmann and Antwi-Nsiah, et al., conducted interviews and focus groups with graduate students (and faculty who supervised or taught graduate students) at the University of Western Ontario to develop a general instruction program directed at the particular needs of graduate students.[6] The resulting program consists of a variety of research skills workshops that are also available as online tutorials.

Green studied the literature review processes of American and Australian doctoral candidates as well as advisors and academic librarians.[7] The study indicated that doctoral students typically develop information literacy through the process of their scholarly endeavors. The author suggested that academic librarians should examine assumptions of information illiteracy when working with this user group. Fleming-May and Yuro queried doctoral students in focus groups regarding their information needs.[8] Based upon conversations within the focus group discussions, the authors suggested a variety of ways in which academic librarians can engage with doctoral students. Additionally, the authors encouraged academic librarians to create "point-of-need" opportunities for engaging students, and suggested that an understanding of the entire dissertation process would help academic librarians in their service delivery.

Through the course of interviewing students for this research project, the authors realized that they had been listening for deficits rather than strengths in the students' information literacy competencies. As a result, the authors began to consider that a "strengths perspective," i.e.,

recognizing and building upon the skills that the students already possessed, would be an important component of working with graduate students. The strengths perspective has long been of use in social sciences practices, most notably social work. A review of the literature revealed a paucity of information in applying the principles of the strengths perspective to the provision of information literacy instruction. For those who are interested, Saleebey gives an overview of the underlying principles of the strengths perspective and its application to the practice of social work.[9]

Methodology

The authors of this study are two subject specialist librarians at the University of Kansas Libraries who have liaison responsibilities to academic departments within the social sciences. In July 2009, the authors applied for and received funding from the University of Kansas Office of Research and Graduate Studies, New Faculty General Research Fund (NFGRF), to conduct interviews and study the research competencies of first year graduate students in select departments within the social sciences (political science, sociology, psychology, and anthropology). The NFGRF funding supported the transcription of the interviews and provided financial incentives for participation in the interviews. The authors also applied for and received approval to conduct the research from the University of Kansas Human Subjects Committee, the Institutional Review Board for the University.

Initially, the authors solicited participation in the project via fliers and e-mail requests to departmental graduate student advisors and faculty who taught a research class to graduate students within their departments. There was a poor response for participation using these methods of recruitment. When the departmental administrative assistants were contacted, however, and asked to forward a request for participation to the incoming graduate students

within their departments, there was a stronger response. In addition, the authors were able to

offer a $25.00 incentive for participation in the interviews. The combination of working with

departmental administrative assistants and offering a financial incentive proved to be the most

successful method of recruitment.

Both the research design and the interview instrument were developed in consultation

with non-library researchers and faculty within the social sciences. The interview instrument

consisted of 21 open-ended questions (see Appendix A). The interviews were held in the

Libraries and both authors were present for the majority of the interviews. Interviews typically

lasted between 30-45 minutes. Each interview was audio taped and subsequently transcribed by

a professional transcriptionist. The privacy of the participants has been protected. The

participants for the project were first -year graduate students in the departments noted above who

had no previous graduate work. The sample did not include those students completing terminal

professional masters' degrees. This specific population was selected in part because the authors

are social sciences librarians and are therefore familiar with the research needs of social

scientists.

Given the limited research on the subject, the authors chose a qualitative research design

using semi-structured interviews, which provide an opportunity for in-depth descriptions. As

discussed by Matthews,[10]

> Qualitative methods are seeking to document the complexities of what is experienced or
> observed. The strength of qualitative data is their rich descriptions . . . it is an attempt to
> understand the "why" and "how."

Forty-nine masters' level graduate students began in the selected four programs in the fall

of 2010, though some of those students had previous graduate work, and therefore were not

eligible for inclusion in this project. All students who responded and met the criterion of no

previous graduate work were interviewed (N = 15). The majority of the students were interviewed within the first six weeks of commencing their graduate studies.   In assessing whether the sample size was too small to yield adequate information, the authors noted Sandelowski, who wrote that[11]:

> An adequate sample size in qualitative research is one that permits – by virtue of not being too large – the deep, case-oriented analysis that is a hallmark of all qualitative inquiry, and that results in - by virtue of not being too small – a new and richly textured understanding of experience."

The adequacy of the sample size was further supported by Wildemuth and Cao, "Intensive studies in information and library science are focused on the richness and quality of the data collected, rather than the number of study participants."[12]

For the purposes of this exploratory research project, the authors concluded that the sample size allowed for a deep understanding of how each graduate student's research skills compared to the ACRL Standards and was sufficient to yield valuable individual information about each new graduate student During the analysis of the interviews, the authors found that the data yielded significant overlap between emerging themes, giving confidence that the students' experiences were consistent and represented typical research processes.

 After the interviews were completed, the authors began the data analysis phase of the project. Qualitative analysis "involves a process designed to condense raw data into categories or themes based on valid inference and interpretation."[13]

Using Atlas-ti qualitative analysis software, the interviews were coded (i.e. assigned categories) according to the ACRL Standards. A priori codes (pre-existing concepts) were developed from Standards One–Four. Hsieh and Shannon explain the coding process:[14]

> First highlighting the exact words from the text that appear to capture key thoughts or concepts. Next, the researcher approaches the text by making notes of

his or her first impressions, thought, and initial analysis. As this process continues, labels for codes emerge that are reflective of more than one key thought.

The authors jointly coded the standards and objectives from each interview, using the examples of ACRL information literacy competencies to identify the correlating actions. Additionally, open codes (emergent concepts) were developed during the coding phase for emerging themes.

Limitations

It is difficult to generalize using qualitative research methods because of the small sample size. Results of this project cannot be generalized to all graduate students, but are intended to identify themes and suggest potential areas of further research and pilot programming.

A limitation of this research methodology was the joint coding of the interviews by the authors which did not allow for independent analysis of the data. The authors could have inadvertently influenced each other in the coding process.

The semi-structured interview format could be considered a limitation in that it may not have allowed the students to freely describe their research processes. In this case, however, the interview format allowed for a great deal of free discourse, enabling the students to fully articulate how they conceived of and carried out the research process used in writing the papers they were describing. As Matthews states, "the semi-structured and unstructured interviews are more appropriate for use in an exploratory study, where the researcher is attempting better understand a situation or subject." [15]

An additional limitation is the reliance upon the students' memories of previous research papers, given that this may not generate valid information. In an effort to minimize memory distortion, the authors asked the students to describe a <u>recent</u> research paper.

A final consideration was the decision not to address the ACRL Information Literacy Standard Five in the interview questions. This Standard most notably discusses the ethical and legal use of information. The original justification for this exclusion was the authors' focus on "research skills" *per se*. As the interviews progressed, however, the authors began to focus more on the actual research process, rather than the mastery of "skills." The authors recognize the importance of the ethical use of information and will include Standard Five in all future aspects of this research project.

Results

The following results are descriptive, providing an insight into 15 graduate students' research processes and skills, i.e., how they describe and implement the research process. The goal of the project was two-fold: to learn about their skills in comparison to the ACRL Standards, and to develop a fuller understanding of how students carry out the research process. The resulting emergent themes not only have implications for further research, including quantitative projects, but they have also led the authors to reconsider traditional methods of library instruction for this user group. The results section describes the authors' observations, specifically whether the students met the ACRL Standards. The section also discusses trends identified during the coding process, including the authors' assumptions related to student information illiteracy, faculty involvement, library/librarian assistance, academic socialization, information saturation, the role of the undergraduate senior project, and student descriptions of their own research and writing processes.

Fulfillment of ACRL Information Literacy Competency Standards for Higher Education

As part of the data analysis process, each student was evaluated on the fulfillment of each of the ACRL Standards outcomes. The process was subjective because of researcher bias and

inconsistency in students' descriptions of their processes or skills. At times, the findings appear to be somewhat contradictory. For example, it was noted that all of the students developed a thesis statement, even though one of the students articulated not being a "thesis statement kind of person." This student went on to describe how her thesis statement often expanded to include new ideas. Her premise was that a thesis statement had to be rigid and so she did not self-identify as using a thesis statement. It was concluded that this demonstrated mastery of the skill, even though the student's description did not appear to initially fulfill the outcome. The outcomes provided a significant guide, however, to understanding the students' skills, enabling the authors to develop a general idea of the information competencies of these students.

The results indicated that the majority of the students fulfilled outcomes as outlined by the ACRL Standards. Included in the breakdown of the study participants' fulfillment of the ACRL Standards are examples of responses that represent how the authors coded for each standard. In the interest of clarity, unnecessary words such as "like" and "you know" have been redacted. Multiple Standards can often be applied to one statement and several of the included quotes were assigned to multiple standards.

Table 1: Breakdown by Study Participant Major

Major	Number of Students
Anthropology	3
Political Science	4
Psychology	4
Sociology	4

Table 2: Students' Fulfillment of ACRL Standards

ACRL Information Literacy Standard	Average Score
Standard 1 (16 outcomes)	91%
Standard 2 (16 outcomes)	72%
Standard 3 (25 outcomes)	80%
Standard 4 (10 outcomes)	65%

Standard 1: The Information literate student determines the nature and extent of the information needed.

Standard 1 represents the area in which students demonstrated the greatest strength. All 15

students demonstrated skills in the following four outcomes:

1. Develops a thesis statement and formulates questions based on the information need
2. Defines or modifies the information need to achieve a manageable focus
3. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information
4. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)

The participants demonstrated information competency related to recognizing information

needs. For example, the following student identified his information need and utilized

different formats, including electronic databases and microfilm:

> It was the library as well, and then electronically it was the library resources . . . I actually went through and looked at some of the microfilms. (Interview 6, 62)

Another student described her process for making her research, and therefore information

needs, more manageable:

It was difficult to even narrow down on the topic because you're looking at the lithic, what am I going to say about this? How is this relevant? How am I going to bring in theory? So I had to do a lot of background research just to even narrow down and once I was able to narrow down a general theory, I was able to go and find a better, more appropriate theory. (Interview 10, 44)

The major area of difficulty in evaluation for Standard 1 was:

1. Considers the feasibility of acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context (5 out of 15)

Deficiencies related to this outcome do not negatively reflect on the overall information literacy competency of the students. Skills such as acquiring a new language are not necessarily essential to all areas of graduate study or academia. Also, the projects they discussed were for undergraduate courses, which carry fewer foreign language requirements than graduate level work.

Standard 2: The information literate student accesses needed information effectively and efficiently.

None of the 22 outcomes in Standard 2 was met by all students. However, 13 students met the following nine outcomes:

1. Implements the search using investigative protocols appropriate to the discipline
2. Uses various search systems to retrieve information in a variety of formats
3. Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration
4. Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources
5. Identifies keywords, synonyms and related terms for the information needed
6. Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized

7. Identifies gaps in the information retrieved and determines if the search strategy should be revised
8. Repeats the search using the revised strategy as necessary
9. Records all pertinent citation information for future reference

The following quote is excerpted from an interview during which the student described a research project in which original data was collected for a literature review. This student demonstrated several outcomes of information literacy, including appropriate investigative methods and identifying gaps in the information retrieved:

> Once you get your data and you check results out, you either get exactly what you wanted, or you get something different. And so, at that point, you take what you got, and then you, again, try and sort it into an existing theory. So then you sort of do it again, go back to the literature review. (Interview 8, 86)

The following student demonstrated the use of various search systems and use of keywords:

> I used WorldCat, and I searched for human body- political aspects. There weren't a lot of books just on the politics of the human body. . . . So I had to look at individual issues: abortion - political aspects, pornography - political aspects. (Interview 9, 34)

One example of the students utilizing a variety of investigative protocols was the use of footnotes and citation searching. One student described how she accessed information:

> I was using the research database kind of thing. That's where I started. And from there you could find certain authors of footnotes. You start to see names come up, the same name over and over. I started looking up books specifically by the people whose names I saw multiple times. (Interview 3, 45)

The above quote also demonstrates the different terminology students use to describe library databases. Throughout the interviews, the students would describe using the "library web site," "web," "search engines," and databases by specific names. While not part of the final analysis in this study, it is an interesting area that may deserve additional research to communicate with

students more effectively by being more flexible with library terminology.

The main areas of difficulty in evaluation in Standard 2 were:

1. Selects controlled vocabulary specific to the discipline or information retrieval source (2 out

   of 15)

   This outcome is difficult to measure because of the specific use of the term "controlled

   vocabulary;" most students describe using keywords rather than subject terms or descriptors.

2. Selects among various technologies the most appropriate one for the task of extracting the
   needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual
   equipment, or exploratory instruments) (2 out 15)

This outcome was challenging to evaluate because the students did not address the equipment

they used, nor were they specifically asked for this information during the interview process. The

authors concluded that evaluating the specific use of technology, e.g., scanning an article was

unnecessary because the use of these technologies was peripheral to the research question

regarding graduate students.

**Standard 3: The information literate student evaluates information and its sources
critically and incorporates selected information into his or her knowledge base and value
system.**

Out of the 25 outcomes in Standard 3, all 15 students demonstrated the skills in the following
eight outcomes:
1. Reads the text and selects main ideas
2. Restates textual concepts in his/her own words and selects data accurately
3. Determines whether information satisfies the research or other information need
4. Draws conclusions based upon information gathered
5. Integrates new information with previous information or knowledge
6. Selects information that provides evidence for the topic
7. Determines if original information need has been satisfied or if additional information is
   needed
8. Reviews information retrieval sources used and expands to include others as needed

The following interview excerpts are examples that meet at least one outcome of Standard 3. For example, the students demonstrated an awareness of main ideas and theories in their disciplines, and how they integrate into their own research. The following student quotes were responses in response to these interview questions:

      a. How did you choose the sources?
      b. How did you decide whether a source was useful? Appropriate?
      c. How did you know you were done with the research?

> Essentially the main component of the literature review was to highlight all of the different kind of areas of political science where there was disagreement. The point of that literature review was to do a literature review not only a summary of the articles or books that kind of converged on these ideas, but elaborate on why you are taking one position over the other. (Interview 14, 40)

> You say, what we got fits this theory, or what we got sort of opposes this theory, and might fit better with this theory. Or, no one's found this before; it seems as if this theory connects to it, even though no one's connected that before. The first lit search is sort of has anyone done this before, what are some possible methods we can sort of borrow. The second lit search after the data collection is kind of how can we explain these results. (Interview 2, 110)

The major area of difficulty in evaluation in Standard 3 was:

1. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms) (0 out of 15)

The lack of participation in the above mentioned forms of communication is not necessarily an indication of lack of competency; rather it can be an indication of the types of support mechanisms that are provided or preferred by instructors.

Standard 4: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

All 15 students demonstrated skills in the following three outcomes linked to Standard 4:

1. Integrates the new and prior information, including quotations and paraphrasing, in a manner that supports the purposes of the product or performance

2. Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience
3. Communicates clearly and with a style that supports the purposes of the intended audience

 The following student description indicates an awareness of the intended audience and how

expectations change:

> In terms of previous research papers or research I was writing for specific courses, it was much more in depth. They [faculty] were more critical of how you dealt with the kind of conversion of ideas in some of those sources to make sure that you were stating why you chose one source over another. (Interview 14, 38)

While discussing how she outlines, the following student indicates an awareness of the need for

citing sources:

> I jot it down [outline] the way I'm going to structure my paper and put the main points that I want to hit in each section and what sources I want to cite and pull from each section. (Interview 7, 28)

The major areas of difficulty in evaluation associated with Standard 4 were:

1. Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process (1 out of 15).

This outcome is not necessarily indicative of a lack of information-seeking skills among

students, but reinforces the authors' observations that students lack awareness of their own

research processes.

2. Incorporates principles of design and communication (1 out of 15).

While principles of design and communication are important, none of the students interviewed

directly articulated information regarding this outcome, making evaluation difficult.

Size of Undergraduate Institution

Of the 15 interview participants, seven went to large undergraduate institutions, three attended

medium size-universities, and five attended small schools (mainly small liberal arts colleges).

The authors' initial reactions, immediately following the interviews, was that the students who

attended smaller colleges demonstrated stronger information literacy skills because these

students often described large senior projects using language typically associated with academic

research. After closely examining and evaluating all students, however, the size of the college

did not appear to strongly correlate with the level of information literacy competency. This once

again demonstrates the value of qualitative research. The results of the analysis found equal

distribution of skill level across all three institution sizes. Factors other than college size had a

stronger impact on the information literacy competency of students, including faculty

involvement and the completion of a senior project.

Trends Identified during Coding Process

Authors' Assumptions of Student Information Illiteracy

One of the most significant factors that emerged was the awareness of the authors' own biases

toward the information illiteracy of students. During the inception, planning, and interview

phases, the authors assumed that all of the students interviewed would lack key information

literacy skills and knowledge. This may be a common perspective among academic librarians, as

Green notes, "[academic librarians] seemed predisposed toward the view of doctoral candidates

as information illiterate or lacking information skills."[16] The authors, immediately following

several interviews, informally noted that the students seemed to lack basic information literacy

skills. However, during the data analysis phase, when transcribed interviews were coding to the

ACRL Standards, it became clear that the majority of students possessed high levels of information literacy addressing most of the performance indicators in the ACRL Standards. By more carefully reading the students' descriptions of their research processes and coding by the performance indicators that the students had demonstrated, the authors' perceptions began to change. In becoming aware of their own biases, the authors realized that they were focusing too narrowly on the ACRL Standards as the sole measure of information literacy. As a result, the authors began identifying what the students **do** know. The authors speculated that, while students may need assistance refining their skills, they have an understanding of the scope of the graduate research endeavor, which includes an ability to think independently and pursue their own areas of interest.

In other words, these 15 students had genuine intellectual curiosity, which may be more vital to their academic success than the ability to fulfill every outcome included in the ACRL Standards for information literacy. The following student statement is representative of several students' thoughts about graduate school:

> I think you have to take a lot more initiative, and what I mentioned about having fewer guidelines probably applies. You have to choose your own research. I mean you really have to know what you're interested in to start with or you're not going to get anywhere. There's a lot more focus on analytical thinking and critical thinking rather than simply regurgitating someone else's argument and being original too. That's the point I guess (Interview 12, 75).

Faculty Involvement

The important role of teaching faculty in delivering information literacy guidance emerged as a dominant finding in this research. A number of the students discussed faculty mentoring and guidance during the research process. This guidance took several forms, including: learning

about specific resources, meeting with students, and the creation of "checkpoints" to assess the students' work at various points in the research process.

One of the most significant and applicable findings was that the faculty were often the source of information regarding library research, directing students to appropriate databases and suggesting other information sources. This was particularly interesting in light of the findings regarding librarian involvement, which is discussed below. Students in this study learned, or at least remembered, specific resources suggested by their faculty more than those suggested by librarians. This reinforces the important role of faculty in teaching not just about subject content and the research process, but also identifying appropriate library resources. One student stated:

> As an undergrad, I didn't know what PsychInfo was until my last semester as a senior. But only because I was working on my own research project with a faculty member (Interview 2, 16).

Another student described learning about library resources from faculty:

> They were usually very helpful of pointing me in books and even giving me their own books and saying look at this and bring it back and get what you need out of it. So there was faculty. It was the library as well, and then electronically it was the library resources, J-Stor and EBSCO and then obviously the New York Times archives (Interview 14, 62).

In addition to faculty recommending library resources, the students who met with faculty during the research process also had generally higher levels of information competency, as well as a greater understanding of academic socialization (see below) than the students who had not met regularly with their faculty.

Finally, another aspect of faculty involvement that appeared to impact student information literacy competency was the inclusion of what the authors coded as "checkpoints" as

part of the assignment requirements. Nine of the 15 students discussed different types of checkpoints, such as turning in outlines, bibliographies, literature reviews, and thesis statements before the final paper was due. Including checkpoints in the syllabus can be an important part of students developing information literacy skills because it teaches the students concrete steps in the research process, which is a competency not usually provided by librarians. This merits further study. One student found checkpoints helpful in the research process:

> There was a time schedule, which was really extremely helpful. Particularly when this was the first time that you're doing a paper of this magnitude because it had to be 30 pages of writing and then the bibliography. (Interview 2, 9)

The role of teaching faculty, as discussed by the students in this project, is essential in helping them develop as researchers and scholars. A greater understanding of the relationship between faculty involvement and student information literacy is important for academic librarians working with new graduate students and can lead to meaningful collaboration between librarians and teaching faculty in introducing resources.

Librarian/Library Assistance

One surprising finding in analyzing the results was the fact that students seemed not to consider librarian assistance during the research process. None of the students had attended a library session related to the specific research paper that they were describing. Ten students had had at least one library session during their undergraduate careers, but these were often described as moderately helpful. The content of these sessions was described mainly as tours and general instruction regarding searching library resources, such as databases.

Conversely, one student discussed the problem with having too many library sessions as an undergraduate:

I have had one, two, three, four. Four or five and I really think that one was more than enough because they would bring us in, and I mean it's very important to know how to use the library, to know how to use the resources that are available to you. And not to offend anyone, it is an important time in the sun for librarians because they are so unappreciated in academia that, whenever they're given an opportunity to-this has been my experience-to speak, to give the incredible training that they usually have had to do their jobs, they get very excited. And sometimes encourage professors to do it lots of times and once was very informative. The second time cleared up some questions that I had. Three and four made me again want to toss myself out the nearest window (Interview 4, 83).

In addition to the few library instruction sessions requested by faculty and attended by students, only a small percentage of the 15 students (13%) individually requested assistance from librarians, even though all of the students had used library resources to some extent. Again, they turned mainly to their faculty, not librarians. When librarians were consulted, it was usually for services such as interlibrary loan.

Academic Socialization

The graduate students who were interviewed expressed a strong understanding of the way that information is created and used in academia, which the authors describe as "academic socialization." Several of the students demonstrated an awareness of how the academic world functions: how research is conducted and disseminated, and the requisite publishing and presentation of scholarly information throughout their academic careers. Awareness of the full dimension of academic research, especially for those pursuing careers in academia, is significant because it could impact their approach to the entire research process as graduate students and their future professional careers.

One student described the need for collaboration with faculty members to advance his research agenda (Interview 2, 174). He struggled with such collaboration and tried to balance his

21

own theories and the faculty member's theories. The academic librarian needs to be aware of this and similar challenges, because they can also influence the research process of the student, whether the students are aware of this or not. One student demonstrated her awareness of the dynamics of research in academia when she approached her undergraduate project from a long-term perspective. The student said:

> I think I was really anxious the whole time, wondering is this going to be an original contribution to ecological knowledge or am I just redoing something that I haven't happened to read yet? And so that made me really nervous because. . . I would really like to get this published but I don't know if it's good enough (Interview, 7, 72).

Trend: Information Saturation

During analysis, an area of weakness was identified among the students. Some students discussed difficulties with knowing when they had reached the point of information saturation. The students interviewed did not describe problems finding information, instead they found too much. Responses to the question, "How did you know when you were finished with your research?" were enlightening. Nine of the 15 students indicated they only considered that the research was complete when the paper was due, rather than when they felt they had acquired enough information to sufficiently meet their research needs.

One student stated:

> I don't think I was finished with the research part until I was finished with the paper, honestly. It is kind of is a process all the way through until the end. (Interview 11, 80)

Another response:

> I guess I was never really quite sure when I was finished-finished. Towards the deadline you have to wrap it up, you know? (Interview 9, 92)

> Evaluating the Standard Three Outcome was challenging, "Determines if original

information need has been satisfied or if additional information is needed," since most of these

students felt the need for more information, and struggled with consciously recognizing that their information need was met.

Helping students understand information saturation is a topic that would be useful to discuss with students transitioning from undergraduate work to graduate work. Since completing this project, the authors have become more mindful of addressing this topic when working with graduate students. This could be one component of assisting students with academic socialization -- understanding when the information need has been met without the prescription of a deadline. There is a balance between helping students with these types of skills, however, and not inhibiting their own processes.

Trend: Senior Project

The students who described completing a senior project, such as a capstone or thesis, tended to have a strong information literacy competency, as well as better developed academic socialization. These students described in-depth projects that lasted a semester or longer which required detailed research; some were required to conduct original research. One student described her project:

> He [faculty advisor] said I want it to be 40 to 50 pages. I want it to be new research and you have to conduct your research yourself, although of course we were so limited in just a semester that he said I can understand it's not going to be very extensive. So he said at the very least you need ten cases to analyze and you have to include statistics. (Interview 6, 15)

Another student, who had completed a senior honors thesis, stated that the goal of the project was "to develop and then run an independent research project and write it up like a manuscript that I would submit to a journal." (Interview 13, 21)

Both of these projects, which included significant faculty guidance, allowed the students to fully understand the research process from start to finish. Both of these students demonstrated high information literacy competency, as well as a strong understanding of the expectations of graduate school and academia in general. Almost all of the seven students who discussed senior projects had these skills and knowledge. As discussed previously, faculty involvement was essential. The types of educational experiences that undergraduates receive will help them succeed in graduate school. These results also reflect that students who chose to write a senior thesis or capstone were generally academically stronger.

Trend: Students Describing their Own Research and Writing Process

The following quotes are presented from the interviews, with students describing their own processes that demonstrated overall information competency. Some students described traditional research processes: thesis statement, outline, revision. As discussed earlier, the way that the students described their processes was sometimes different than the way librarians typically approach teaching research skills. The students did demonstrate effective methods, however, for successfully completing their research.

As previously noted, one student stated that not having a thesis statement was not necessarily a hindrance for her because it did not fit with her own process:

> That's not normally how I work. I usually think of a topic . . . I've never been a thesis statement person. It just comes out of the topic I'm interested in. My central point came out during my research process, actually, because I started with a topic. . . And through my research, it sort of developed into how their relationship with modern technology was affecting their world view. (Interview 3, 14)

This student's process is more "fluid" than what might be prescribed or taught by librarians or instructors, yet she still demonstrated high information literacy competency.

During the interviews, the authors also perceived an evolution of the students' processes when there were professor requirements, such as outlines. One student's experience:

> We had to actually hand in an outline within a couple of weeks of the class, which I always find helpful. It used to be if I was doing a research project, I wouldn't even write an outline. I would just find my information and write it in this ridiculous, unorganized way. But then I had classes that started making us hand in outlines before we started writing, and I realized that that was actually a pretty good way to do it. So I've been using outlines more.
> (Interview 11, 56)

Implications

The ACRL Standards were a useful tool for the data analysis because they guided the authors in looking for specific skills possessed by the students. For undergraduate student library instruction, the goal is often to teach the individual research skills that are necessary to attain a functional level of information literacy. For graduate students, the ACRL Standards provide a starting point for a stronger focus on teaching about the *research process* itself; this research indicates that graduate students already possess considerable information literacy skills. The authors hope that the results of this investigation will challenge the thinking of academic librarians who teach information literacy skills to incoming graduate students, and prompt further research on the topic. Early results suggest that these widely-used ACRL Standards may be more useful for undergraduate instruction and that information literacy instruction for graduate students could focus more on the research process itself.

Guided Group Discussions

After interviewing the 15 new graduate students, the authors discussed a modified technique of working with graduate students that would shift from traditional library sessions or orientations to a facilitated discussion group for new graduate students. Each discussion group would consist of a cohort of new students from the same department in an informal setting and simply exchanging ideas about their research processes. A series of discussions over the course of their first semester could be scheduled. Some possible topics that emerged through the interviews were:

- **Expectations of graduate work**

  Library-initiated group discussions could include inviting the experienced graduate students and faculty members to discuss graduate school research expectations. These discussions can help alleviate new graduate student anxiety and assist in strengthening the cohort relationship. Many of the graduate students expressed a certain anxiety regarding the rigors and expectations of graduate school. Creating a forum for discussing these concerns with more "seasoned" graduate students and faculty would be useful to these students. Often, academic departments create opportunities for more experienced graduate students to meet with new graduate students. The library- initiated discussion groups offer additional/alternative forum for addressing common concerns and questions regarding graduate school.

- **Identifying individual styles of conducting research**

  Several of the students commented that participating in the interview helped them reflect on and understand their own research process because it was the first time that they had

consciously considered and articulated their own methods.   A strong understanding of their

own individual research process will be necessary as they progress through graduate school.

One student said "It's actually been good to kind of think about it because I've thought more

about research projects. It's kind of timely at this point for me, so it's good" (Interview 14,

104). Guided group discussions can significantly assist students with developing an

awareness of their own styles and skills.

- **Academic socialization**

The authors benefited from the interviews and gained considerable knowledge about

students' individual skills and also about how they approach the research process. This

method of interacting with these emerging scholars contributes to the overall academic

socialization of these students. Librarians participate in the academic socialization process

by helping students to understand the life cycle of scholarly information and the students'

role in this process. One potential topic for group discussion, then, could be the significance

of developing a program of research that builds upon previous research.

The discussion group approach could have several benefits for the librarians, including

establishing a rapport and relationships with the students, helping students understand the

research process at the beginning of their academic careers, and creating a dynamic between

student and librarian that is similar to the students' collaborative relationships with faculty. If

this type of collaborative relationship can be established, librarians will become primary

resources in the minds of graduate students.   Listening to and discussing with graduate students

may prove to be more useful than lecturing to them and making assumptions about what they

27

need to or should know. Librarians have the expertise and opportunity to help graduate students refine their processes and strengthen their skills using each student's own skill base as a starting point. As Green states: [17]

> Thus, drawing attention to doctoral candidates' strategies for engaging with information and literature encourages another view of students' prior knowledge, their experience, and the effect of information attributes that these learners bring with them.

Working with students' strengths and letting go of librarians' information illiteracy bias will help lead to more effective and helpful librarians.

Future Considerations for Programming and Research

In addition to changes in library programming for graduate students, the results of this study demonstrate the important role of faculty involvement in the development of students' research skills. Librarians' integrating their skills with faculty is another way to connect to these students and help them grow as future scholars. Librarians can work with faculty on assignment design and provide support related to senior projects, such as theses and capstones. Meeting and working with undergraduate students who plan to continue on to graduate school would be an effective approach to improving graduate students' research skills before entering graduate school. Connecting with these students would also help make them aware of the variety of library services available to them and more likely to request librarian assistance upon entering graduate school. Also, keeping faculty informed of and providing training with new resources is another way to reach students since many of them learn about resources directly from their instructors.

More research is necessary to build upon the findings presented in this paper. One area for further study would be to develop a survey to identify faculty expectations of the research

skills of incoming graduate students, potentially identifying a "disconnect" between what faculty expect and what the students actually understand about the research process and information literacy. The results of such a survey can be used to inform library instruction programs for new graduate students, as well as to initiate more faculty/librarian collaborations. The authors intend to expand the interview process into a longitudinal study, in which students would be interviewed annually to track their progress through graduate school to identify how they become more proficient as academic researchers.

Another area for additional research is a study to determine whether the research skills of undergraduate students who intend to pursue graduate degrees differ from those who do not intend to advance in academia. Such research would help inform programming for this distinct user population, as well as strengthen librarian relationships with faculty members.

Expanding research that establishes evidence-based programming will ultimately lead to better services to all library user populations. The results of this project have demonstrated the value of gathering qualitative user-centered data. The authors gained greater insight into the research needs of incoming graduate students. The information gathered will change how the authors provide services to these students and will lead to stronger collaborations with faculty.

Appendix A: Interview Instrument

2. What is your department?
3. What was your undergraduate degree in?
4. How long ago did you receive your degree?
5. Describe a recent research paper you wrote.
    a. What was the assignment?
    b. What were the requirements of the paper?
        i. Amount of guidance from the instructor?
6. What kinds of resources did you need to find (scholarly, statistics, etc.)
    a. How did you determine this
7. How did you start?
    a. Why did you choose to start that way?
    b. What was your next step?
8. Did you use an outline?
9. Did you begin with a defined research question? If not, how did you define the question?
10. Where do you go (electronically or physically) to collect information?
    a. How did you choose the sources?
    b. How did you decide whether a source was useful? Appropriate?
    c. Why did you choose that source over another one?
    d. Did availability affect your decision to use a source?
    e. Was it important to find only full-text articles?
11. Did you search for information on the Web?
12. Did you use a Library's resources in your search?
13. How did you know when you were done with the research?
14. How much time did you have to complete the paper? Did that influence your approach to collecting information?
15. Did you ask for assistance? Discuss the project with anyone?
    a. From whom? How did you decide who to ask?
    b. What kind of assistance did you request?
16. Anything especially challenging with the assignment? Did anything make you nervous or anxious during the research?
17. Did you find the assignment personally interesting? Why or why not? (Did you get to choose the topic or was it assigned?)
18. Where did you do your work?
    a. Did you use a laptop or a desktop?
19. How do you think graduate work differs from undergraduate work?
20. Have you ever had a library session in your academic career?
21. Did you receive library instruction for the paper you described?
    a. If you have had a library session, how has it prepared you for graduate school?

22. Do you have any final thoughts or comments about the research process you would like to add?

Notes

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[14] Hsiu-Fang Hsieh and Sarah E. Shannon, "Three Approaches to Qualitative Content Analysis," *Qualitative Health Research,* 15, 9 (2005): 1277-1288, 1279.

[15] Ibid., 10, 57

[16] Ibid.,7, 314

[17] Ibid., 7, 318