

# The Almost Experts: Capstone Students and the Research Process

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*Librarians may spend hours with upper-division undergraduates completing a capstone, thesis, or other culminating project. This paper reports about a multi-year study of capstone students at a mid-sized public university. With quantitative and qualitative data, this research illuminates the challenges experienced by capstone students, highlighting the instruction and support desired by undergraduates in the final stages of their college careers, offering insights into authentic interventions that librarians might explore for this student population.*

## Introduction

Librarians may spend hours with upper-division undergraduate students who are working on a capstone, senior thesis, or other culminating project. The 2009 National Survey of Student Engagement (NSSE)<sup>1</sup> reported that one-third of its respondents participated in a culminating project in the course of fulfilling their degree. Although capstone projects are not compulsory at many colleges and universities an increasing emphasis on high-impact practices advocated by the Association of American Colleges and Universities has encouraged undergraduate-serving institutions to expand opportunities for students to embark on in-depth research that goes well beyond the 8-10 page research paper.

Beyond anecdotal experience, what do we know about the information needs of undergraduates beginning advanced research projects? This paper reports findings from a small multi-year study of capstone students at the University of Wisconsin-Eau Claire, a mid-sized public university. Using a survey tool and follow-up interviews, the author has collected quan-

titative and qualitative data about capstone students and their challenges.

## Background

For the purpose of this research “capstone” will be used to describe a range of “culminating experiences” which students have in their final year or years of college. These experiences may include writing or presenting the results of research, either independently or in collaboration with other students. Capstone projects vary by institution and by discipline. A capstone may be a written work, a presentation, poster, portfolio, or a combination of products, but most students are expected to conduct research as part of the capstone. Capstone experiences are often based in a student’s major department or discipline; some institutions offer interdisciplinary capstone opportunities, while others may offer culminating experiences tied to career planning or transitioning into the workforce.<sup>2</sup> Capstone experiences are typically associated with a seminar or course, often described as a “senior seminar,” a “thesis seminar,” “capstone course,” or “honors

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seminar” during which students complete some or all of the work associated with the capstone. However, some colleges and universities offer co-curricular capstone experiences. This research specifically focuses on students enrolled in a capstone or thesis course.

In 1998, the Boyer Commission on Educating Undergraduates in the Research University identified a “culminating” or capstone research experience as an essential element of the reinvention of undergraduate education.<sup>3</sup> A decade later, Kuh and the Association of American Colleges and Universities (AAC&U) characterized capstone projects as one of several “high impact practices” that foster transformative thinking and learning.<sup>4</sup> In 2012, NSSE reported that 47% college freshmen in the United States plan to complete a capstone; in contrast, 31% of college seniors have completed a capstone and 28% of college seniors plan to complete a capstone.<sup>5</sup>

This study examines the research experiences and needs of students completing a culminating project, commonly described as a “capstone” or a senior thesis. After joining the faculty of the library at the University of Wisconsin-Eau Claire in 2010, the author observed that the library fielded a large number of reference questions from students engaged in capstone or senior thesis research. During an information literacy instruction session with class of capstone students in history, the teaching faculty introduced the author by saying to the students, “You’re here in the library today because you’re almost experts.” With enrollment of 11,000, the University of Wisconsin-Eau Claire primarily serves undergraduate students. The University does not have a required for-credit information literacy course; however, many students are exposed to information literacy concepts and research strategies in general education courses and through courses in their major and minor disciplines. The author observed that capstone students had uneven experiences with searching for, evaluating, and integrating a variety of information into their research, though many seemed to be familiar with the library.

### **Literature Review**

Although the National Survey of Student Engagement gives us an estimate of the number of capstone students and the nature of their projects, less information is available about the extent to which capstone students use the library or consult with librarians during the course of their research. Recent literature

about undergraduate information seeking has expanded our knowledge of the research practices of college students in general.

Among the vast literature about undergraduate information seeking practices, recent publications by Project Information Literacy (PIL) shed light on how college students navigate a sea of information.<sup>6</sup> Having surveyed more than 11,000 students at 60 colleges and universities, PIL offers a comprehensive and data rich view of undergraduates who rarely consult with librarians, rely on a limited set of familiar resources, have self-taught methods of evaluating information,<sup>7</sup> and who struggle to begin research projects and ask meaningful research questions.<sup>8</sup>

Ethnographic research projects at the University of Rochester<sup>9</sup> and at five colleges and universities in Illinois<sup>10</sup> take us inside the student experience with research. Burns and Harper report that students are confident about their research abilities and they depend on a wide range of materials when writing a research paper, but they do not instinctively go to the library or librarians for help.<sup>11</sup> Miller and Murillo report that students lack relationships with librarians and are more likely to seek research help from peers or family.<sup>12</sup>

Less available is research specifically about the information seeking practices of undergraduates at the capstone stage of their college careers. The professor who suggested that capstone students were “almost experts” might assume that college students in their third or fourth years have honed their research skills, learned to ask for help, and are ready to begin the culminating research project of their college careers. Monroe-Gulick and Petr note that new graduates students in the social sciences who had completed a capstone project are “academically stronger” and exhibit strong information literacy competence, suggesting that the process of creating a capstone project helps students to advance to graduate-level experience.<sup>13</sup> Fogarty and Mayo (1999) discuss the characteristics of the senior thesis in finance at the College of New Jersey, and the results of a survey of alumni who completed the finance thesis.<sup>14</sup> In interviews with college seniors completing a major research paper, Whitmire aimed to understand the relationship between students’ information seeking behavior and their epistemological beliefs (i.e., the theories and attitudes they have about knowing).<sup>15</sup> Whitmire suggests that undergraduate epistemological beliefs may influence

whether they are willing to consult with a librarian about their research.<sup>16</sup>

In a review of the literature about librarians and undergraduate thesis support, Harrington identifies literature that may inform library practice in developing support services for thesis researchers.<sup>17</sup> Harrington's literature review offers helpful summaries of library-writing center collaborations, models for ethical inquiry, research consultation programs, and services for postgraduate students that may be applicable to senior thesis writers. Some authors discuss programs implemented by librarians to support senior thesis research; for example, Smith and Kayongo describe the outcome of a "senior thesis camp" at the University of Notre Dame.<sup>18</sup> Citing the Boyer Report, Wright (2001) suggests a model for supporting senior thesis research with a library-credit course.<sup>19</sup> Leadley and Rosenberg (2005) share the collaborative design of a course that prepares students to conduct research in an interdisciplinary program at the University of Washington, Bothel.<sup>20</sup>

This exploratory research attempts to distinguish the research experiences of capstone students from broader research about the information seeking behavior of first-year college students or undergraduates in general.

### Methods

This exploratory study was designed to gather information about the experiences of advanced undergraduate researchers at the University of Wisconsin-Eau Claire. A Web-based survey and a qualitative interview instrument were approved the Institutional Review Board. The survey was distributed using Qualtrics, a survey system for which the university has a site license (<http://www.qualtrics.com>), and five individual students participated in a 40 minute follow-up interview with the author.

From January 2011–December 2013, capstone students were surveyed at the conclusion of, or following, the semester in which they submitted the final product of their research. The survey has been distributed to a random sample of 495 students enrolled in capstone courses offered by 16 departments or programs at the University of Wisconsin-Eau Claire. 82 students have responded to the survey, a response rate of 17%.

Respondents to this survey represented 21 majors. Eighty-nine percent of respondents indicated that they had taken at least one course in which a li-

brarian had provided a one-shot information literacy workshop. Sixty-eight percent of respondents indicated that at least one librarian had met with their capstone seminar to discuss advanced research in their discipline.

This survey relies on the memories of undergraduate students who have completed a lengthy and often complex research project. The sample size and self-reported nature of the data may limit our ability to generalize about the results. However, as an exploratory study of capstone students, this research may offer a snapshot of capstone students' perceived challenges, and areas of intervention that they believe would be authentic to their research experience.

### Findings

The findings of this research are divided into two parts: first, the characteristics of the capstone projects undertaken at the investigating institution; second, the challenges that capstone students report they encounter in the research process. Capstone experiences vary between institutions, thus limiting the author's ability to generalize about research practices of all undergraduate capstone students. Librarians who wish to develop services specifically for capstone students must still explore the nature and type of projects undertaken by students on their local campuses. However, data collected by this survey indicates that the majority of students at the University of Wisconsin-Eau Claire primarily complete research papers, a finding that mirrors NSSE's 2009 special report about culminating senior experiences.<sup>21</sup>

### Type of Project

The traditional research paper dominated the type of project completed by survey respondents. Seventy-seven percent of the capstone projects completed by respondents involved a research paper. Among those who wrote a research paper, 82% were longer than 20 pages. Eighteen percent of reported projects involved a research paper combined with another mode of dissemination, like a poster presented at a student research conference or a presentation to a capstone class or honors symposium.

As shown in table 1, respondents reported the kinds of information they consulted in the course their capstone research. When asked to "check all that apply," no survey respondent selected a single type of information.

**TABLE 1**  
**Sources Consulted in Capstone Research**

Source Type	Number	%
Books	76	95%
Scholarly articles	76	95%
Newspaper articles	43	54%
Magazine articles	34	43%
Primary sources, such as letters, diaries, interviews, or photographs	56	70%
Statistics and data	48	60%
Government documents	43	54%
Maps	23	29%
Films	14	18%
Visual images	32	40%
Information provided by faculty	24	30%
Other	5	6%

Note: Percentage does not add to 100 because of the possibility of multiple answers.

When asked where they located the information they consulted, respondents reported utilizing a wide variety of tools, as shown in table 2.

The students included in this survey sample had varying degrees of exposure to information literacy instruction. The capstone students who reported no experience with information literacy instruction de-

**TABLE 2**  
**Tools Utilized in Capstone Research**

	Number	%
McIntyre Library journal and article databases	74	90%
McIntyre Library Catalog	66	80%
Internet search engines (i.e., Google, Yahoo!, Bing, etc.)	63	77%
Among material I already own	34	41%
McIntyre Library Special Collections & Archives	33	40%
My academic department	27	33%
My professor's office	26	32%
I will collect experimental or survey data	14	17%
Other	7	9%

Note: Percentage does not add to 100 because of the possibility of multiple answers.

livered by a librarian indicated that they had utilized Internet search engines at a slightly greater rate than capstone students who reported experience with information literacy instruction.

The number of respondents who indicated that they had consulted archives and special collections may appear to be very high. However, at the investigating institution, the library's special collections and archives are heavily embedded in the history curriculum and all history majors complete a capstone.

### Challenges

Although students who responded to this survey reported utilizing a wide variety of tools to locate information, including search engines as well as library resources, "finding useful information" was identified as the most challenging aspect of research. In a similar finding, a 2010 Project Information Literacy report found that 61% of sampled students were challenged by filtering irrelevant information.<sup>22</sup>

Among follow-up interview subjects, the issues shown in figure 2 were recurring themes. Interview subjects repeatedly cited filtering information, and identifying the "best" information in a sea of results, as stumbling blocks. Additionally, each of the five follow-up interview subjects reported that they had changed their capstone topics at least once in the early or middle stages of research.

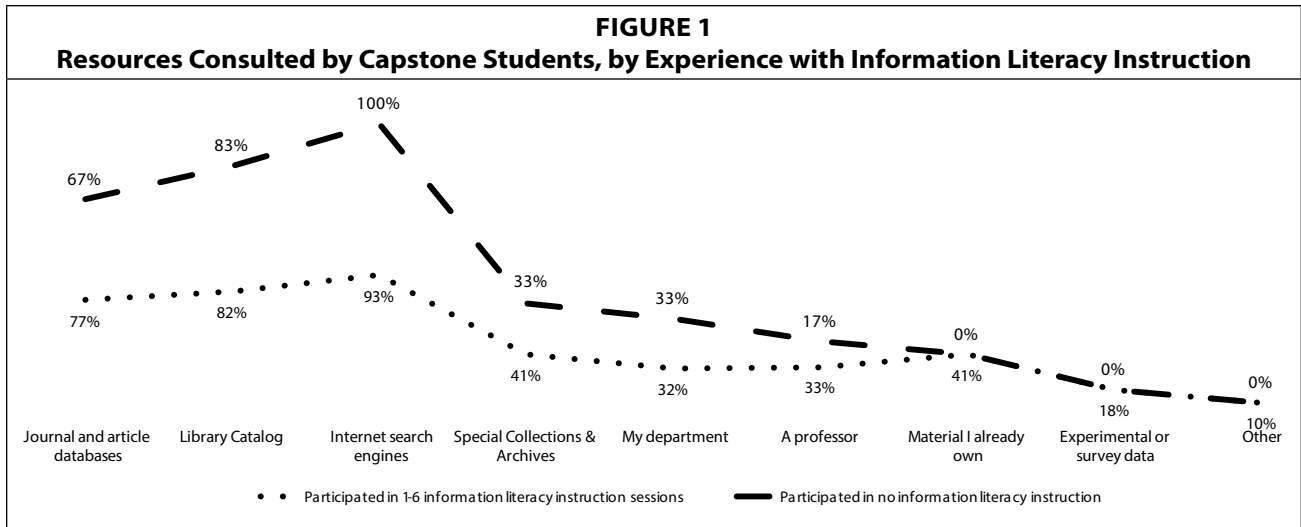
Survey respondents were asked to identify who they turned to when they were troubled by an aspect of their capstone research. Table 3 shows that students overwhelmingly turned to faculty in their major departments; however, with the option to "check all that apply," many students also selected "friends" or "librarians."

When asked how a consultation with a librarian could have helped improve the capstone research experience, 36% of survey respondents indicated that a librarian could have helped them refine a literature re-

**TABLE 3**  
**Individuals Consulted for Assistance**

Faculty	77	95%
Librarians	46	57%
Classmates/Peers	39	48%
Other	3	4%

Note: Percentage does not add to 100 because of the possibility of multiple answers.



view and 71% of respondents indicated that a librarian could have helped them to “search effectively” in library databases.

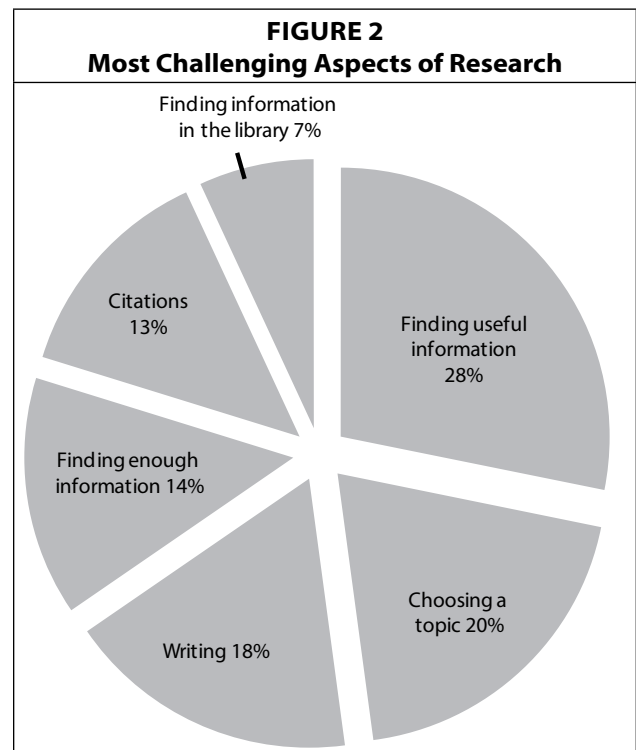
Sixty-four percent of survey respondents said they wished they had asked a librarian how to find government documents and 46% said they wished they had asked about finding statistics and data. One follow up interview subject offered some insight: “Managing my time was a struggle with my capstone. I spent a lot of time finding just one piece of information, and then I would realize I also needed numbers or government reports, but I had blown all my time finding a good article and so I would, like, gloss over the other types of information I could have used.”

**Discussion and Conclusions**

Typical of capstone projects nationally, the majority of projects completed by this survey’s respondents wrote research papers. Further research is warranted about the characteristics of capstone projects that combine a research paper with another mode of dissemination, especially research posters. Notably, none of this survey’s respondents indicated that their capstone would take the form of a performance or exhibition, a practice that is likely more common in the arts.

Capstone students at the University of Wisconsin-Eau Claire appear to be relatively confident about using library research tools, as well as freely available search engines. While we might expect capstone students to begin their research with advanced information literacy competencies, the subjects of this research appear to struggle with the same issues as the general population of undergraduates. Survey re-

spondents reported that identifying useful information and choosing a topic were the most challenging aspects of the research process. As Project Information Literacy has noted, a students are often stymied by anxiety about choosing and narrowing a topic.<sup>23</sup> Choosing the topic of a capstone project may be doubly provoking because it represents the culmination of undergraduate learning. The five students who participated in follow-up interviews with the author all noted that they had changed their topic at least once. One interview subject described “toying” with



several research topics, but abandoning each because “information seemed unavailable.” While anecdotal, this student’s story suggests that an area of further research may be the link between topic selection and a student’s ability to locate relevant information.

Follow-up interviews illuminated the challenges that students experienced with filtering irrelevant information:

“When I searched for stuff I found too much! I know how to find books and articles, but I never know if I’m reading the most important stuff.”

“I searched the library catalog, but I didn’t know where to start when my search gave me 10,000 books. I felt lucky when I figured out a book was likely to help.”

“I don’t really get how my profs and librarians figure out what is really important. I always just try to find the most recent articles, but then my adviser gave me this article from 1991 and it was probably the most helpful source I read.”

These student observations exposed areas of emphasis for librarians designing information literacy instruction for capstone researchers in any discipline. Students with no exposure to information literacy instruction appear to be marginally more inclined to search for information utilizing a search engine than library databases. This same group may be less inclined to use a variety of library resources; however, this survey’s small sample size requires caution in drawing firm conclusions. At the investigating institution, this research has informed development of lesson plans and learning objects to guide topic selection. We have also refined lesson plans related to conducting a comprehensive literature review appropriate to a discipline. Miller and Murillo have previously noted that students “see professors as part of an established structure at the university to support their research.”<sup>24</sup> Indeed, among this study’s participants, even those who had contact with a librarian at some point during their undergraduate careers did not immediately resort to seeking help in the library. The findings of this research have also enabled librarians to reach out specifically to faculty who guide capstone research, and to those who mentor undergraduate researchers in several contexts, opening up new opportunities for information literacy instruction.

By profiling capstone students, this research may offer academic librarians a new view of patrons who are at once sophisticated and still growing as researchers. Students beginning the capstone process may view themselves as seasoned researchers, and their faculty mentors may view them as “almost expert” researchers. However, by focusing exclusively on this population of academic library users who already have some experience with research, this survey of capstone students reveals that they may not begin their projects with the tools they need for a demanding inquiry. Monroe-Gulick and Petr observe that new graduate students in the social sciences have significant advantages if they have completed a capstone or senior thesis as undergraduates.<sup>25</sup> If capstone students lack sophistication at the beginning of the research process, perhaps their research fosters the “transformation” that Kuh suggests is characteristic of high-impact practices like undergraduate capstone experiences.

## Notes

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