TRUTH BE TOLD:

How College Students Evaluate and Use Information in the Digital Age

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PROJECT INFORMATION LITERACY PROGRESS REPORT

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Abstract: A report about college students and their information-seeking strategies and research difficulties, including findings from 8,353 survey respondents from college students on 25 campuses distributed across the U.S. in spring of 2010, as part of Project Information Literacy. Respondents reported taking little at face value and were frequent evaluators of Web and library sources used for course work, and to a lesser extent, of Web content for personal use. Most respondents turned to friends and family when asking for help with evaluating information for personal use and instructors when evaluating information for course research. Respondents reported using a repertoire of research techniques—mostly for writing papers—for completing one research assignment to the next, though few respondents reported using Web 2.0 applications for collaborating on assignments. Even though most respondents considered themselves adept at finding and evaluating information, especially when it was retrieved from the Web, students reported difficulties getting started with research assignments and determining the nature and scope of what was required of them. Overall, the findings suggest students use an information-seeking and research strategy driven by efficiency and predictability for managing and controlling all of the information available to them on college campuses, though conducting comprehensive research and learning something new is important to most, along with passing the course and the grade received. Recommendations are included for how campus-wide stakeholders—faculty, librarians, and higher education administrators—can work together to help inform pedagogies for a new century.

A 32-year-old librarian relates what now seems like a quaint memory from a simpler time. Not that many years ago, while conducting a literature review for her own humanities dissertation, she was able to search and exhaust every information source her campus library had to offer.

But for many of today's undergraduates, the idea of being able to conduct an exhaustive search is inconceivable. Information seems to be as limitless as the universe. And research is one of the most difficult challenges facing students in the digital age.

Introduction

Project Information Literacy (PIL) is a national research study based in the University of Washington Information School.[1] In our ongoing research, we have studied how college students conduct research and find information—their needs, strategies, and workarounds. So far, we have focused our research efforts on how students find information and their preferred use of information sources for course work and in their daily lives.

In this report, we continue our investigation by asking how students evaluate information and use information once they have found it. What difficulties do students encounter with course-related and everyday life research from start to finish?

We collected data to answer these questions by administering a student survey in the spring of 2010 to 112,844 undergraduates. Our findings are based on a collective sample of 8,353 students enrolled at 25 U.S. colleges and universities.[2]

Major Findings

The beginning of the course-related research process is rife with challenges for most college students, according to our survey results.

Even though many students may consider themselves adept at evaluating information and applying techniques for tackling one course-related research assignment to the next, the sheer act of just getting started on research assignments and defining a research inquiry was overwhelming for students—more so than any of the subsequent steps in the research process.

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[1] Project Information Literacy (PIL) is co-directed by Alison J. Head, Ph.D., Research Scientist in the University of Washington Information School and Michael B. Eisenberg, Ph.D., Dean Emeritus and Professor in the University of Washington Information School. PIL is supported with contributing funds from the John D. and Catherine T. MacArthur Foundation. Communication about this progress report should be sent to Dr. Alison Head at ajhead1@uw.edu or Dr. Michael Eisenberg at mbe@uw.edu. Visit the PIL project Web site for an overview of PIL's ongoing research.

[2] We administered a 22-item online survey to sophomores, juniors, and seniors at 25 institutions across the U.S. during March through May 2010. See Appendix C in this report for the survey instrument we administered. All but the State College of Florida Manatee-Sarasota were four-year institutions. Given the sample size (n=8,353), our study is the largest scholarly survey analysis of information literacy, to date. For a full list of institutions participating in the study and a discussion of methods, see the Appendix A: Methods.

Moreover, half of the students in our sample reported nagging uncertainties with concluding and assessing the quality of their own research efforts. [3] Have I done a good job? How do I sort through all that I've found to find what I need? How do I know when to stop looking?

All in all, the findings suggest students in both large universities and small colleges use a risk-averse strategy based on efficiency and predictability in order to manage and control the information available to them on campuses. Still, most students struggle with the same frustrating open-endedness when trying to find information and conduct research for college courses and to a far lesser extent, for solving an information problem in their personal lives.

Major findings are as follows:

1. Students in the sample took little at face value and reported they were frequent evaluators of information culled from the Web and to a lesser extent, the campus library. More often than anything else, respondents considered whether information was up-to-date and current when evaluating Web content (77%) and library materials (67%) for course work.

2. Evaluating information was often a collaborative process—almost two-thirds of the respondents (61%) reportedly turned to friends and/or family members when they needed help and advice with sorting through and evaluating information for personal use. Nearly half of the students in the sample (49%) frequently asked instructors for assistance with assessing the quality of sources for course work—far fewer asked librarians (11%) for assistance.

> **For over three-fourths (84%) of the students surveyed, the most difficult step of the course-related research process was getting started.**

3. The majority of the sample used routines for completing one research assignment to the next, including writing a thesis statement (58%), adding personal perspective to papers (55%), and developing a working outline (51%). Many techniques were learned in high school and ported to college, according to students we interviewed.

4. Despite their reputation of being avid computer users who are fluent with new technologies, few students in our sample had used a growing number of Web 2.0 applications within the past six months for collaborating on course research assignments and/or managing research tasks.

5. For over three-fourths (84%) of the students surveyed, the most difficult step of the course-related research process was getting started. Defining a topic (66%), narrowing it down (62%), and filtering through irrelevant results (61%) frequently hampered students in the sample, too. Follow-up interviews suggest students lacked the research acumen for framing an inquiry in the digital age where information abounds and intellectual discovery was paradoxically overwhelming for them.

6. Comparatively, students reported having far fewer problems finding information for personal use, though sorting through results for solving an information problem in their daily lives hamstrung more than a third of the students in the sample (41%).

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[3] On average, 48% of the sample reported having difficulties with these three steps during their course-related research process.

7. Unsurprisingly, what mattered most to students while they were working on course-related research assignments was passing the course (99%), finishing the assignment (97%), and getting a good grade (97%). Yet, three-quarters of the sample also reported they considered carrying out comprehensive research of a topic (78%) and learning something new (78%) of importance to them, too.

Our analysis shows robust relationships and similarities among variables from our sample of students at 25 educational institutions in the U.S. However, these findings should not be viewed as comprehensive, but as another part of our ongoing research.

While additional research is warranted in order to confirm whether or not our conclusions may be generalized to the nationwide college and university population, the size of our sample and consistent patterns of responses do lend credibility to our findings.

In the following pages, we present detailed findings from our analysis in three parts:

Part One: A comparative analysis of how students find information and prioritize their use of information sources, based on survey data from last year (2009) and this year's survey (2010).

Part Two: Findings about how students evaluate information they find on the Web and through the library for course work and personal use. In addition, findings about how students use routine techniques for completing for course-related research assignments, including their use of Web 2.0 applications.

Part Three: Findings about the difficulties, challenges, and obstacles students frequently encounter during the entire research process—from start to finish—for course work and for personal use.

Approach

Our ongoing study is grounded in information-seeking behavior research. We study how college students conceptualize and operationalize course-related and everyday life research. We investigate these research processes through students' accounts, reports, experiences, and processes.

We define *course-related research* in broad terms—from the moment students receive a research assignment in a college course through collecting materials until turning in the final assignment to an instructor.

According to this year's survey results, the majority of students in the sample reported frequently conducting research for argument papers (74%), oral presentations (60%), and interpretative readings of texts (i.e., close readings) (57%).

We define *everyday life research* as the research students conduct for personal reasons and for use in their daily lives.

When it came to conducting research for personal use, the majority of students in this year's sample most frequently searched for information about news and current events (79%), purchasing a product or a service (74%), health and wellness (74%), or work and/or career (67%), travel and trip-planning (61%), and social contacts (51%).

The Survey

We collected data from a large voluntary sample of sophomores, juniors, and seniors enrolled at U.S. colleges and universities during the spring of 2010. [4]

Our survey instrument was constructed to collect data about how students find, use, and apply information for course work and personal use. We also collected data about the difficulties they have with research steps that occur throughout.

To frame our research questions in this study, we have drawn on our own ongoing research and existing literature about information literacy and research studies about digital natives.

In particular, we asked:

> **How do undergraduates find, evaluate, and select the information they need for course-related and everyday life research?**

1. How do undergraduates find, evaluate, and select the information they need for course-related and everyday life research?

2. What techniques and routines do students use for information and fulfilling course-related research assignments, including their use of Web 2.0 applications?

3. What difficulties arise for students during the different steps and stages of course-related and everyday life research?

4. What recommendations can we make as researchers, in light of this study's findings, for teaching and working with today's students?

We analyzed our data using frequencies, cross tabulations, scales, and statistical tests about comparative groups within the sample.[5] We also conducted a small set of follow-up telephone interviews with students from the sample to provide qualitative texture to the survey data.[6]

Detailed Findings

Part One: Finding Information Revisited

Since 2008, we have conducted ongoing research about how students find information, including how students in the digital age conceptualize and operationalize research.

So far, we have discovered students begin their course-related research activities in search of *research contexts*, in one form or another. Specifically, finding a research context entails getting

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[4] See Appendix A for more details about the study's research methods, for descriptive data about the sample, and for who participated in the study. In addition, see page 45 of this report (Appendix A: Methods) for a discussion of the sampling methods we used and the limitations of voluntary survey samples.

[5] We used t-tests and analysis of variance (ANOVA) to compare whether the differences among groups (i.e., disciplinary areas of study and enrollment level and difficulties with research stages) were statistically significant.

[6] We conducted 25 follow-up telephone interviews (15 – 30 minutes in length) during August and September 2010 with students in the sample who had volunteered their time. The purpose of the interviews was to add qualitative texture in the form of supplementary details to the survey results. The script appears at the end of the Appendix A: Methods.

information for interpreting and defining information need. It is often a laborious and/or frustrating step in the students' research process.

We have defined a working typology of four research contexts undergraduates often seek during their research processes, whether they are searching for information for course work or personal use (Figure 1).

The contexts we have defined are for finding: (1) big picture context or background about a topic, (2) the meaning of language, (3) situational factors, including another person's (i.e., instructor's) expectations, and (4) relevant information sources from all the sources that may be available.[7]

Figure 1: Typology of the Undergraduate Search for Context

Research Contexts			
Big Picture Context	Language Context	Situational Context	Information-Gathering Context

RESULTS
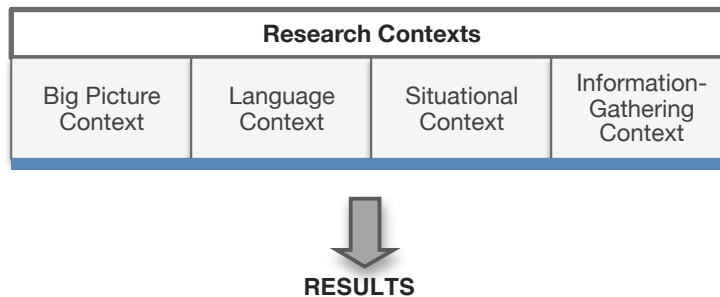
Moreover, we have found students develop an information strategy for finding context at the beginning of their research process. They depend on the use of a small set of information resources, whether they are conducting research for a course or to satisfy their own curiosity.

Comparative Analysis: 2010 and 2009 Surveys

In this study, we began our analysis by comparing data from this year's survey with data from last year's survey. In particular, we compared data about how students prioritized their selection and use of information sources used for course-related and everyday life research.
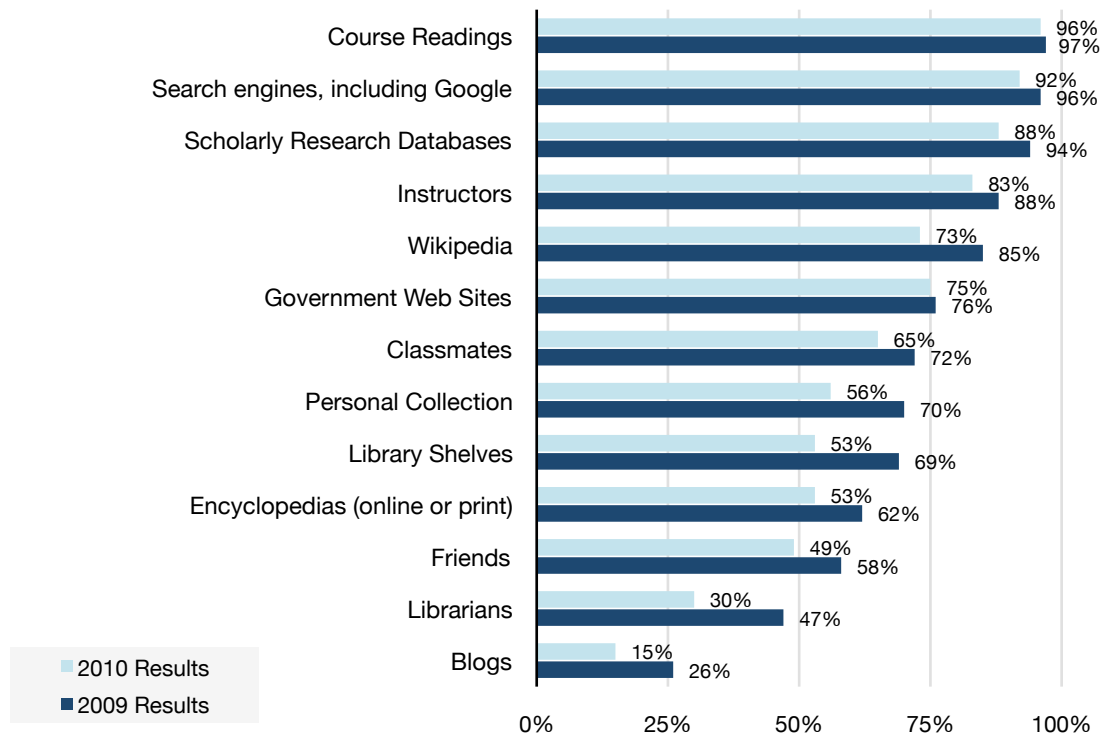
Did students from both samples have similar patterns and preferences for the information sources they used for course work and for solving information problems in their daily lives?

In Figure 2 and Figure 3, we present two comparative charts that show what resources students frequently use for course work and for personal use, based on results from our 2009 and 2010 student surveys.[8]

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[7] See A. J. Head, and M. B. Eisenberg, (2010). Assigning Inquiry: How Handouts for Research Assignments Guide Today's College Students, pp. 9 - 18 and A. J. Head and M. B. Eisenberg (2009). Finding Context: What Today's College Student Say about Conducting Research in the Digital Age.
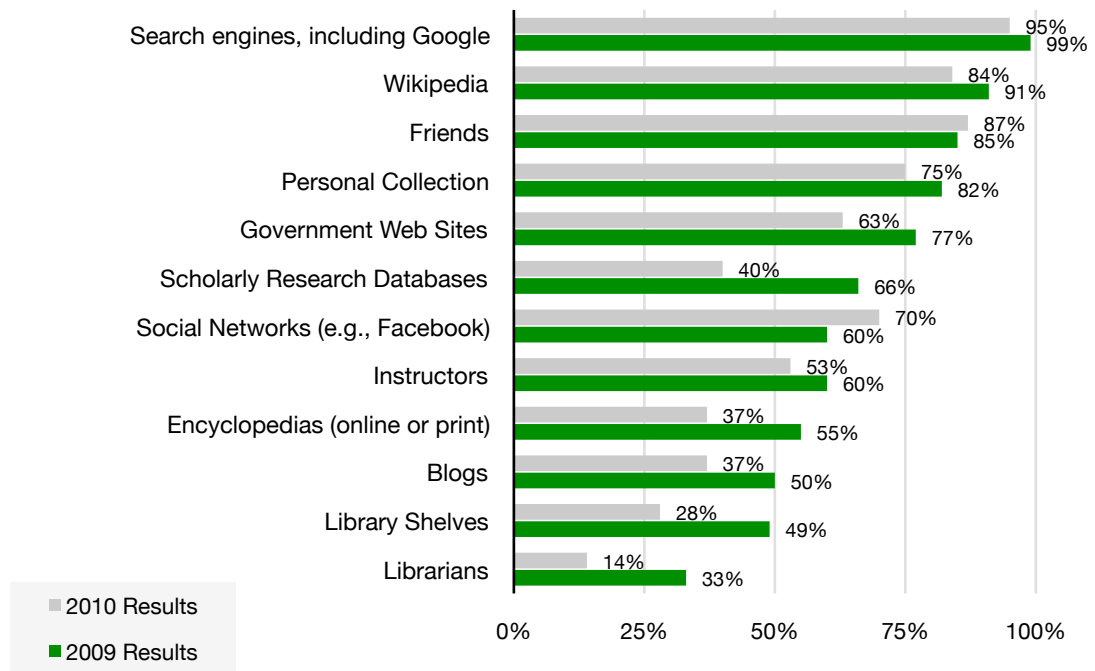
[8] As a point of reference, the sample for 2010 was 8,353 from 25 colleges and universities and the sample for 2009 was 2,318 students from six colleges and universities.

Figure 2: Sources Used for Course-Related Research (2010 vs. 2009 Survey Data)

Source	2010 Results	2009 Results
Course Readings	96%	97%
Search engines, including Google	92%	96%
Scholarly Research Databases	88%	94%
Instructors	83%	88%
Wikipedia	73%	85%
Government Web Sites	75%	76%
Classmates	65%	72%
Personal Collection	56%	70%
Library Shelves	53%	69%
Encyclopedias (online or print)	53%	62%
Friends	49%	58%
Librarians	30%	47%
Blogs	15%	26%

Results are ranked from most frequent to least frequent sources students used for course work. Responses of "almost always," "often," and "sometimes" have been conflated into a new category of "use."

Figure 3: Sources Used for Everyday Life Research (2010 vs. 2009 Survey Data)

Source	2010 Results	2009 Results
Search engines, including Google	95%	99%
Wikipedia	84%	91%
Friends	87%	85%
Personal Collection	75%	82%
Government Web Sites	63%	77%
Scholarly Research Databases	40%	66%
Social Networks (e.g., Facebook)	70%	60%
Instructors	53%	60%
Encyclopedias (online or print)	37%	55%
Blogs	37%	50%
Library Shelves	28%	49%
Librarians	14%	33%

Results are ranked from the most to the least frequent sources students used for course work. Responses of "almost always," "often," and "sometimes" have been conflated into a new category of "use."

Our comparative analysis is revealing and informative, especially given the collective sample sizes of over 10,000 respondents surveyed from 31 U.S. colleges and universities. The results are very similar from one year to the next.

We summarize the findings as follows:

1. The students in the 2010 sample used the same set of information resources for course-related research in the same order of frequency as did students in the 2009 sample (Figure 2).[9] In other words, most students studied in either year's sample relied on the same few sources of information and turned to the same sources first, second, third, and so forth to fulfill course-related research assignments.

2. Notably, almost all students reported turning to course readings first—not to search engines such as Google, as assumed by some librarians and educators.[10] In addition, students consulted Wikipedia to a lesser extent than they used instructors, scholarly research databases, search engines, and course readings when completing research for courses.

3. Students in the 2010 sample and students in the 2009 sample exhibited the same preferences for information sources used in everyday life research—with only a few exceptions (Figure 2).

4. In large part, almost all students we have studied turn to search engines—such as Google—and Wikipedia, and friends most often when looking for information for use in their daily lives.

5. Students in the 2010 sample used social networking sites and friends more frequently than did the 2009 sample. Also, a third fewer students in this year's sample (40%) used scholarly research databases for everyday life research than did students in last year's sample (66%).

Students in this year's sample reported using librarians less often than they reported in the 2009 survey results.

6. Students relied on librarians infrequently, if ever, whether they were conducting research for course work or for personal use. Moreover, students in this year's sample reported using librarians less often than they reported in the 2009 survey results.

The comparative findings from this analysis are a milestone in our research about how students conduct research in the digital age. This year's survey findings validate last year's findings.

Moreover, the data provides strong evidence that students are driven by familiarity and habit and that they use the same set of information resources in a very similar order of preference for course-related and everyday life research.[11,12]

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[9] For the 2009 percentage results of resource prioritization for course-related and everyday life research, we averaged students' use of sources for finding big picture, language, situational, and information-gathering context. See findings and the discussion in A. J. Head and M. B. Eisenberg (2009). Lessons Learned: How College Student Seek Information in the Digital Age. In all cases, the percentage has been calculated to represent "use" and is based on conflated responses of "almost always," "often," and "sometimes."

[10] For discussions of students' predominant use of the Web, including search engines such as Google, see S. Kolowich (2009). Searching for Better Research Habits. *Inside HigherEd* and C. Thompson (2003). Information Illiterate or Lazy: How College Students Use Web Resources. *Libraries and the Academy*, *3* (2), 259-268.

[11] In particular, the comparative sets of findings from 2009 and 2010 student surveys add *construct validity* to our findings about how students prioritize their use of information resources, as the measures ask precisely about the very phenomena and underlying construct that we purport to be measuring.

[12] To evaluate agreement between the rankings for each year of survey results in Figure 1 and Figure 2, we calculated Kendall's W, also known as the coefficient of concordance, Generally, Kendall's W ranges from 0 (no agreement) to 1 (100% agreement). In our results, the result for course-related research was 1.0 (2009 vs. 2010) and the result for

Part Two: Evaluating and Using Information

None of the old-timers—the old professors—can really give us much advice on sorting through and evaluating resources. I think we're kind of one of the first generations to have too much information, as opposed to too little. We've never had instruction really on navigating the Internet and picking out good resources. We've kind of been tossed into this and we've just learned through experience we have to go on a Web site and just raid it for information. So I would say that despite all that's out there, it certainly is harder to find the right source and evaluate whether it's good, or not, because there's so much—you only have a little bit of time to spend on each source you find.

- Engineering student in a follow-up interview

An essential step in the research process is evaluating the quality of information once it is found. Is the source credible? Is the information up-to-date? Is the information accurate? Is the source useful for the solving the information problem at hand?

Whether it occurs with a cursory glance or an exhaustive review, evaluation requires critical thinking and decision-making about the validity of a source based on a diverse set of available criteria. Evaluation involves assessment about the potential usefulness of information within a set of circumstances and information needs.

In this section, we investigate how college students evaluate information they have found for course work and that they use in everyday life. Further, we investigate students' routines and techniques for applying sources they have selected to course research assignments.

How Students Evaluate Web Content

How do students evaluate content they have found on the World Wide Web—the omnipotent, go-to public source?[13]

The need to vet the Web's staggering amount of unfiltered and collaborative content is a topic frequently addressed by librarians and educators.[14]

Much of the discussion centers on effective methods of determining credibility and reliability of content, coupled with the potential complexity of the Web evaluation process—depending, of course, on how thorough an assessment is.[15,16]

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everyday life research (2009 vs. 2010) was .98, indicating that the rankings from the 2009 and 2010 surveys, per type of research, were very high in agreement.

[13] Definitions for public Internet sources can be ambiguous. We define public Web sources as a subset of the Internet that has a URL ending in .com, gov. or .org and further, that tends, for the very large part, to be "no fee" vs. "for fee."

[14] See ACRL's Information Literacy Competency Standards for Higher Education (2000) and a discussion about the "escalating complexity" of the information landscape that raises questions about "authenticity, validity, and reliability" of "unfiltered" and "multiple media" (accessed from the Association of College and Research Libraries (ACRL) site on August 18, 2010). There have also been practical guides for evaluating Web content, such as J. Kapoun (1998). Teaching Undergrads Web Evaluation: A Guide for Library Instruction. *C&RL News*, July/August 1998, 522-523.

[15] For further reading, see S. S. Sundar (2007). The MAIN Model: A Heuristic Approach to Understanding Technology Effects on Credibility. In M. J. Metzger & A. J. Flanagin (Eds), *Digital Media, Youth, and Credibility*. Cambridge, MA: MIT Press, 2008, 73-100 and M. J. Metzger (2007). Making Sense of Credibility on the Web: Models for Evaluating Online Information and Recommendations for Future Research. *Journal of the American Society of Information Science and Technology*, *53* (13), 2078.

We collected data from students about three types of evaluation criteria that may be used for evaluating the quality of information: (1) timeliness and authority, (2) domain-specific standards, and (3) self-taught methods.[17] In Figure 4, we outline the evaluation criteria used in the analysis.

Figure 4: Evaluation Criteria for Web Content

Types of Evaluation Standards for Web Content

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1. Traditional standards of timeliness and authority: Timeliness is the basis for determining the currency of research material (e.g., publication date). Authority is the basis for determining whether a source has reliable authorship (e.g., who created the source; author's credentials). These criteria are derived from the scholarly print world and librarianship.[18]

2. Domain-specific standards: Domain-specific standards have been ushered in by the Internet and are often used for judging the reliability, authority, and credibility of Web content. In our analysis, we included criteria for deciphering the origins of a URL, analyzing the presence of external links to other sites on the Internet, and the presence of footer details (e.g., when a site was last updated).[19]

3. Self-taught methods: Self-taught methods are the basis for judging content by applying intuition and/or techniques acquired from friends, classmates, or other informal contacts.[20] In our analysis, we include familiarity with a site and/or gauging a site's visual presentation for judging authority and credibility. These criteria tend to be personal and highly qualitative formal standards.

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[16] For purposes of our discussion, we use Tseng's and Fogg's definition of Web credibility as being a perceived quality of the believability as determined from the perspective of the observer's individual perception. See S. Tseng and B. J. Fogg (1999). Credibility and Computing Technology. *Communications of the ACM*, *42* (5), 39-44.

[17] Our use of the three types of evaluation methods in our analysis are not meant to be an exhaustive collection of methods and criteria that could be applied for determining the quality of information presented. Rather, our methods are a representation of what students in our ongoing research have reported frequently using, as well as standards notably communicated by library Web sites about evaluation methods. For comparative purposes and given the scope of our research inquiry, we have also included a category for librarian referrals as criteria for determining the quality of Web content. For a discussion of the checklist vs. contextual approach to evaluating resources, see C. Meola (2004). Chucking the Checklist: A Contextual Approach to Teaching Undergraduates Web-Site Evaluation. *Libraries and the Academy, 4,* (3), 331-344.

[18] This a general discussion of two librarian standards for assessing the information quality of research sources and suggest the following sites for more background information: U.C. Berkeley's Library and How to Critically Evaluate Information Resources from Cornell University's Library (accessed on July 30, 2010).

[19] In developing our survey questions about the use of Web evaluation standards, we consulted several library online evaluation guides, including those from Blue Ridge Community College, Colgate University, New Mexico State University, Purdue University, and U.C. Berkeley. (Accessed on January 5, 2010).

[20] During our student discussion groups in 2009 at six institutions, participants described using various methods for determining the information quality of sources. Some methods students discussed were described as being self-taught, such as relying on brand loyalty of a site (i.e., Google) or gauging the design of a site. For related scholarly research about how students assess Web content, especially the credibility of sites, see E. Hargittai, L. Fullerton, E. Menchen-Trevino, and K. Thomas (2010). Trust Online: Young Adults' Evaluation of Web Content. *International Journal of Communication*, *4*, 468-494 and C. N. Walthen and J. Burkell. (2002). Believe It or Not: Factors Influencing Credibility on the Web. *Journal of the American Society of Information Science and Technology*, *53* (2), 134-144. (Accessed on August 3, 2010.)

We present a comparative chart in Figure 5 with results about the most frequently applied evaluation criterion.

Figure 5: Criteria for Evaluating Web Content
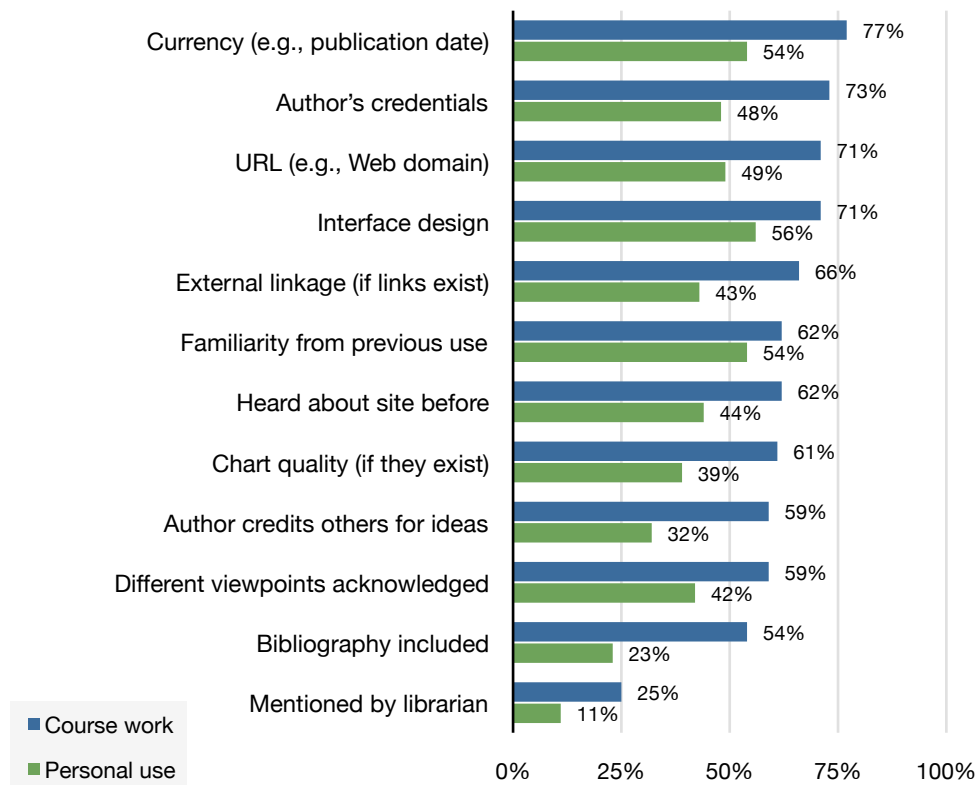
Results are ranked from most frequent to least frequent evaluation techniques respondents used for course work (blue bars). Evaluation techniques for personal use (green bars) do not correspond to the same order as those for course work. Responses of "almost always" and "often" have been conflated into a new category of "frequent use." See Appendix B, Figures 5A and Figure 5B for complete data sets.

In Figure 6 (on the following page) we present a side-by-side comparison of the criteria students used for evaluating Web content for course work and personal use.

Taken together, the findings suggest students are frequent evaluators of the information they find on the Web. The majority of students applied a blended approach to critically evaluate both Web content for course work or personal use, drawing on procedural and formal standards for judging information quality and on self-taught methods.

When evaluating Web content for course work, students in the sample most often used formal standards for sizing up the quality of what they had found. They assessed whether Web content was up-to-date (77%) more than they used any other proxy for information quality.

Yet, many respondents also used self-taught methods nearly as frequently as formal standards, especially assessing the design of a site (71%). In follow-up interviews, students mentioned checking a site for typos, misspellings and a poor use of graphics and navigational systems as a basis of evaluating design and the credibility of content.

Figure 6: Comparative Details about Evaluating Web Content

Web Content for Course Work	Web Content for Personal Use
1. Most often, students in the sample used formal standards—authority and timeliness—for evaluating Web content. Respondents considered the currency of information presented (77%) and to a lesser extent, an author's credentials (73%) and/or a site's URL (71%).	1. More students in the sample relied on self-taught methods for evaluating Web content for personal use. Respondents considered a site's design (56%) most often and to a lesser extent whether they were familiar with a site from prior usage (54%).
2. Two-thirds of the sample also used self-taught methods when evaluating Web content for course work. Most often, respondents considered the design of a site (71%), and to a lesser extent, familiarity from previous use (62%), or having heard about a site (62%).	2. About half the respondents used formal standards of timeliness (54%) and authority when evaluating a site for personal use. Standards included judging a site's URL (49%) and/or an author's credentials (48%).[21]
3. About half the sample used domain-specific standards for judging Web content for course work. Respondents checked for external links (66%), whether an author gave credit for sources used (59%), and/or if a bibliography exists (54%).	3. Less than half of the respondents used domain-specific standards for determining the accuracy of Web content for personal use. Respondents checked for external links (43%), whether an author credited sources used (32%), and/or whether a bibliography existed (23%).

By comparison, in this case, students in the sample evaluated Web content less often when information was for personal use. Still, the majority of students surveyed relied on self-taught methods to suss out quality, including a site's design (56%) and whether they had used the site before (54%) along with formal standards such as how current information presented was (54%).

A referral from a librarian had little impact on how students weighed the information they found on a Web site. Only one in four of the respondents (25%) frequently considered whether a librarian had referred them to using a site when they evaluated the quality of Web content for course-related research or even less so, for everyday life research (11%).

Asking Others for Help and Advice

In our prior research, we found that students, in general, relied on several key people for guidance during their research process.[22]

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[21] In a 2010 study of first-year college students and their online credibility assessment practices, researchers found branding (e.g., trust in certain search engines and the results they returned) and routine (i.e., familiarity with a site from previous use) were "essential signifiers" for assessing the credibility of Web sites. Our findings about *familiarity* (i.e., evaluating a site based on previous use and/or hearing about a site) corroborate this study's findings. See E. Harigittai et al, Trust Online; Young Adults' Evaluation of Web Content, op cit.

[22] In our 2009 student survey, we found, on the average, respondents reported using the following people as sources for course-related research: Instructors (88%), friends (58%), and librarians (47%). For everyday life research, respondents reported using the following people as sources: Friends (85%), instructors (73%), and librarians (33%). See findings and the discussion about "Resource Prioritization" when the need for certain research contexts arises on pages 14 - 18 in A. J. Head and M. B. Eisenberg, (2009), Lessons Learned: How College Student Seek Information in the Digital Age.

In this study, we investigated this finding in greater depth. We asked students whom they turned to when asking for help with evaluating both online and print sources for course work and personal use.

In Figure 7, we present a comparative chart. We ranked the people respondents turned to for evaluation help when conducting research for course work and personal use.

Figure 7: Asking for Help with Evaluation
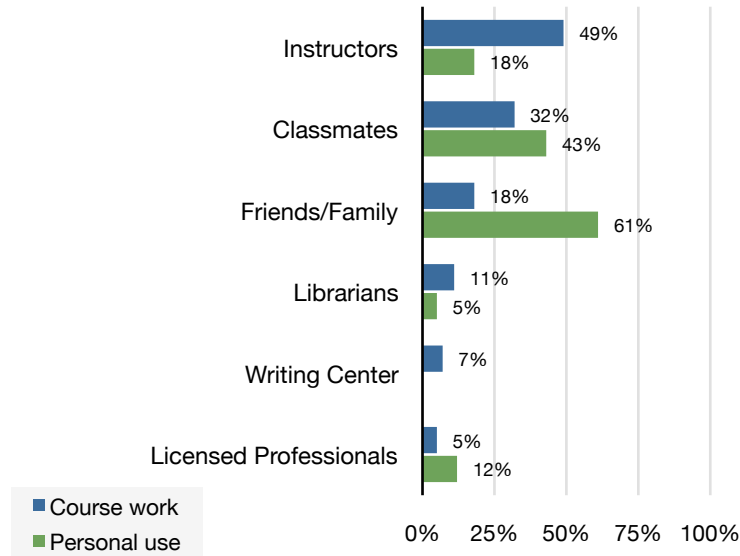
Results are ranked from most frequent to least frequent used people that students turn to for evaluation guidance and help. Responses of "almost always" and "often" have been conflated into a new category of "frequent use." See Appendix B, Figure 7A and 7B for complete data.

We summarize the findings as follows:

1. Almost two-thirds of the students sampled (61%) asked friends and/or family when they needed help with evaluating sources for personal use—more than they asked classmates (43%) or instructors (18%)—or anyone else.

2. For course-related research, more students in the sample turned to instructors for help (49%) with evaluating course-related research materials found on the Web or through the library.[23]

3. Few students in the sample asked librarians (11%) or writing center staff (7%) for help when judging the information quality of sources for course work, and even fewer used turned to librarians for help evaluating information for personal use (5%).

4. A small percentage of the sample turned to licensed professionals (e.g., physicians, attorneys, therapists) for help with evaluating information for use in their everyday lives (12%) or course work (5%).

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[23] See findings and the discussion about the role of instructors as research coaches on pages 28 - 30 in Head, A. J. and Eisenberg, M. B. (2009), Lessons Learned: How College Student Seek Information in the Digital Age.

Taken together, the findings suggest students frequently turn to certain go-to people when they ask for help with evaluating the information they have found. At the same time, the findings suggest evaluation is far from being a solitary task for most students.

When conducting research for course work, students most frequently turned to instructors (49%) for help. During research for personal use, students relied on support from friends and/or family (61%).

These findings suggest evaluation requires collaborative support and input from a friend, family member, or instructor. According to these findings, few students in our sample let Web content stand on its own without some discussion with someone else.

Few students in our sample let Web content stand on its own without some discussion with someone else.

Focus on Course-Related Research

As an additional part of our inquiry we focused on course-related research and how students in the sample evaluated and applied information.

In this section, we present results about how students evaluated Web and library sources and services for course work. We also present findings about the routines they used for completing one assignment to the next.

Evaluating Library Materials vs. Web Content

In our first analysis, we investigated how students evaluated library materials—books, print journals, and scholarly research database materials (e.g., EBSCO, JSTOR, and/or ProQuest).

When conducting research for course work, do students evaluate library materials as frequently and using the same criteria as they do Web content? The results appear in Figure 8 (on the following page).

Overall, the results indicate students in the sample evaluated Web content using more available criteria than they did library materials (i.e., print and online sources).

At the same time, the majority of students surveyed reported using four or fewer standards (57%) for evaluating library materials.[24] In general, students evaluate Web content for course-related research using more standards of scrutiny than they do for everyday life research.

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[24] We calculated an evaluation score based on the frequencies per respondent with which specific responses occurred about criteria for evaluating Web content and library sources. We then summarized the results of the scores by using percentages.

Figure 8: Criteria for Evaluating Library Sources vs. Web Content
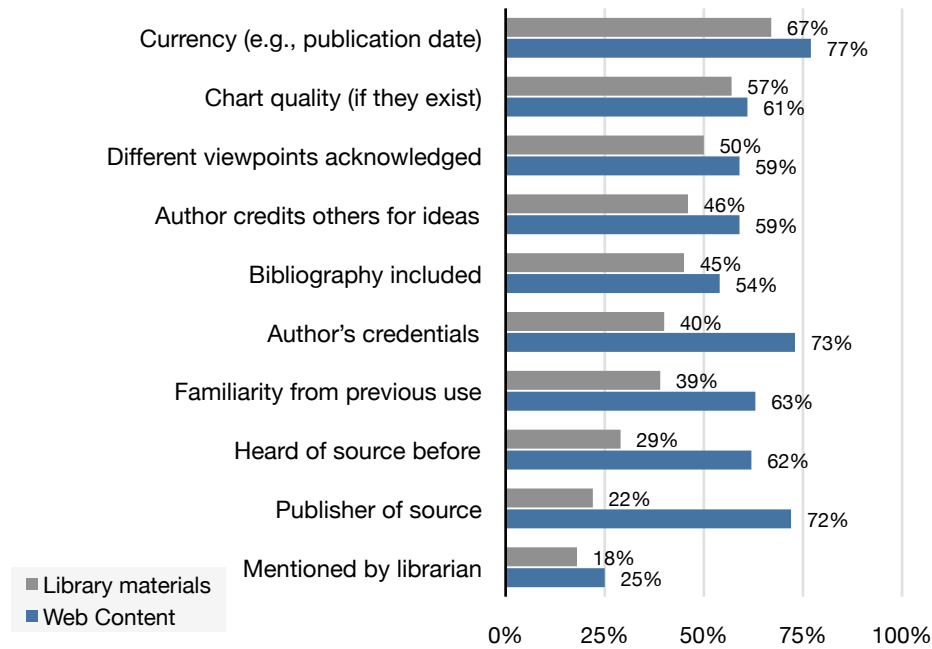
Ranked from most frequent to least frequent evaluation techniques. Responses of "almost always" and "often" have been conflated into a new category of "frequent use." See Appendix B, Figure 8A and Figure 8B, for complete data sets

Moreover, when we calculated individual "evaluation scores," for each respondent, we found the majority of students in the sample (55%) reported using 7 or more standards (e.g., currency, URL, and interface design) for evaluating Web content and about half as many, 4 or fewer standards, for judging library materials. The results appear in Figure 9.

Figure 9: Evaluation Scores

Source of Information	Evaluation Score
Public Web sites	**7 or more standards used**
Library materials (print and online)	**4 or fewer standards used**

There is a logical explanation for why students evaluated library materials less often. Librarians use collection development policies for building their collection, editorial boards of peer-reviewed scholarly journals, and aggregators of scholarly research databases.

Given these assurances, it is fair to assume that students think library sources require less evaluation than information posted by anyone on the open-source Web. Students may figure a less exhaustive evaluation is needed when they are conducting course-related research.

Still, currency matters. Students in the sample weighed the currency of information they found for course work more often than anything else, whether they found the content on the Web (77%) and/or to a lesser extent, in the library (67%).

Interestingly, whether a source was familiar to students mattered little when students in the sample reported evaluating library materials. Even though 63% of the students surveyed considered familiarity with a source important for course work, far fewer (39%) applied the criteria to books, library databases, or journals found in the library.

Role of Librarians

Librarians, who are campus advocates for evaluating the quality of information, played a relatively minor role in students' evaluation activities. Few respondents considered whether a librarian had referred them to a Web site (25%) or library materials (18%) when deciding on whether to use a source for course-related research.[25]

Moreover, we found respondents, when they needed help, infrequently turned to librarians for advice or guidance when they were trying to determine the quality of sources for possible use on course assignments.

About one in 10 of the respondents (11%) asked librarians for help while completing evaluation for course work and far fewer—one in 20 students surveyed—reported asking librarians about materials for personal use.

The findings confirm earlier findings from our ongoing research: *Students, in fact, use libraries— but most of students use library resources—not librarian-related services.*[26]

Further, the data from this study tells us more about students, evaluation activities, and librarian interactions. We conclude students ask for help with evaluating materials from instructors far more than they do from librarians and few consider a librarian referral when evaluating and selecting materials.

Evaluation by Discipline

As another step in our analysis, we investigated how students evaluated Web content and library materials, based on their disciplinary area of study (i.e., arts and humanities, business administration, engineering, social sciences, and sciences).

Overall, students majoring in arts and humanities were the most frequent evaluators of both Web content and library sources in all cases but one—the information design of charts.

Respondents in the sciences (62%) and engineering (61%) reported they often, if not always, evaluated the information quality of charts from library sources. Students in these two majors did so more so than their peers in the social sciences (55%), business administration (52%), or arts and humanities (51%).

> **Students majoring in arts and humanities were the most frequent evaluators of both Web content and library sources in all cases but one— the information design of charts.**

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[25] Question #14 asked about librarian referrals in a broad sense--we did not specify where and when the referral for using a given source may have occurred (e.g., a training session, a reference desk session).

[26] See findings and the discussion about the role of instructors as research coaches on pages 23 - 24 in A. J. Head and M. B. Eisenberg (2009). Lessons Learned: How College Student Seek Information in the Digital Age.

Likewise, respondents majoring in engineering (67%) and the sciences (65%) reported they frequently evaluated the information design of charts found on the Web. In comparison, students in the sample who were majoring in the social sciences (60%), business administration (58%), and arts and humanities (55%) considered the information quality of charts from Web sites.

This finding intuitively makes sense. Students in engineering and sciences are more likely to rely on charts to illustrate the systematic technical and quantitative data that tends to characterize much of the content in their field.

Student Interviews: Time and Effort

These findings about evaluation suggest that students take very little at face value. Students appear to spend time critically evaluating the information they find, especially when the content is from the Web and intended for use in course work.

That said, we wondered how much time and effort students in the sample spent on evaluating the information quality of sources.

As a point of reference, we asked students in our follow-up interviews about what percentage of total time spent on research they put into evaluating sources. This percentage ranged from 10% to 30% of students' total research time.

One third of the students we interviewed used a minimalist "checklist" approach when conducting evaluation. These students said they relied on one or two criteria for assessing the quality of information they had found. If a source met their standards, they continued with fulfilling the rest of the research assignment.

The checklist approach adhered to some of the rigors of applying accepted evaluation standards, in part, but students did not treat evaluation as a process—but rather as a procedural step or routine. The comments suggest evaluation was a hurdle they needed to clear, rather than an essential aspect of selecting and synthesizing information, and then formulating their own argument for an assignment.

As one student in the sciences said:

> *Time spent on actually evaluating? I know, probably not as much as I should. I'm going to be honest. I fall into the trap all the time of 'Is it from a university publisher?' Sometimes I just assume that it's good then as opposed to actually evaluating whether or not the source is good, or not.*

Yet, for the remainder of interviewees—two-thirds of the students we interviewed—evaluation was inherently tied to the selection of materials. Evaluation was a requisite winnowing process— even if it was carried out within self-imposed time constraints.

A student in business administration explained:

> *So, first of all I'm not going to start working on an assignment as soon as the professor gives it. From when I'm starting research to when I'm finishing my paper, in that span of time I spend about 20% to 30% on evaluation—no more than that. Even in the preliminary round of checking, just because it's been drilled into us, it takes time to look at what sources you're citing. In the preliminary round, I just eliminate the ones that don't sound very authentic; I don't even end up looking at those. And the ones that I do get are the ones that I do check.*

For many students we interviewed, evaluating sources was time-consuming and arduous, though it was perceived as essential. Not only was the evaluation process inextricably tied to scaffolding a sound argument, but also selecting valid and reliable sources for an assignment was important to their credibility as researchers and as students.

A student in the social sciences explained:

> *Evaluation is the hardest part of research for me, honestly because it's the part that involves the most critical thinking. So, that tends to be harder than just picking a topic or whatever. But I think the main thing is trying to sort through all of the information that you've gathered and you have different points of view and you have different authors—different people that have already written about a topic—so, then it becomes your job to sift through all that information and make sense of all that you have found for yourself. I think that's the most challenging part of a research assignment—I always spend time on evaluation because it hurts my own credibility as a researcher if I don't scrutinize the resources I'm relying on.*

As a whole, our results show that the students surveyed were frequent evaluators of information when conducting research for course work. The evaluation scorecard indicates about twice as many standards were used to evaluate Web content, than library materials.

Few students we interviewed thought of evaluation as a separate, disembodied step in their research process.

However, the underlying question about how much time and effort students in the sample actually spent on evaluation resulted in some revealing qualitative analysis from the interviews. Few students we interviewed thought of evaluation as a separate, disembodied step in their research process.

Rather, a greater number of the students interviewed—two-thirds—considered evaluation a necessary winnowing process for scaffolding arguments and information they presented in their assignments, which was tied to their credibility as researchers.[27]

Research Routines for Course Work

> *Most of college I've used just about the same techniques from one assignment to the next: I do the research, then I figure out what I'm going to write, and then I sit down and write the paper. I kind of took the best parts of what they had us do in high school and got rid of all the tedious parts, like writing 500 note cards and labeling them. I've condensed it to just taking notes on pieces of paper and different things like that. So, my research style is somewhere between high school—where they forced you to do their techniques—and then college—where they don't really care where you get your information—as long as it's right and you write a good paper.*
>
> *- Student in the sciences in a follow-up interview*

In this part of our analysis, we turn our attention to *research styles*—the practices, routines, techniques, and workarounds students use for completing course-related research assignments from one class to the next.

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[27] We acknowledge the findings from our interviews about how much time and effort students actually spend on evaluating Web and library materials are limited by the size of the sample and the findings and warrant further research.

In our prior research, we have stated that today's students are not naïve about sources, systems, and information services available to them and apply their problem-solving strategies that help them meet their school needs, as they arise.[28]

In this year's survey, we examine this finding in greater depth by asking what research styles and routine techniques do students often have in their repertoire for completing course-related research assignments. How do students apply and use information for assignments?
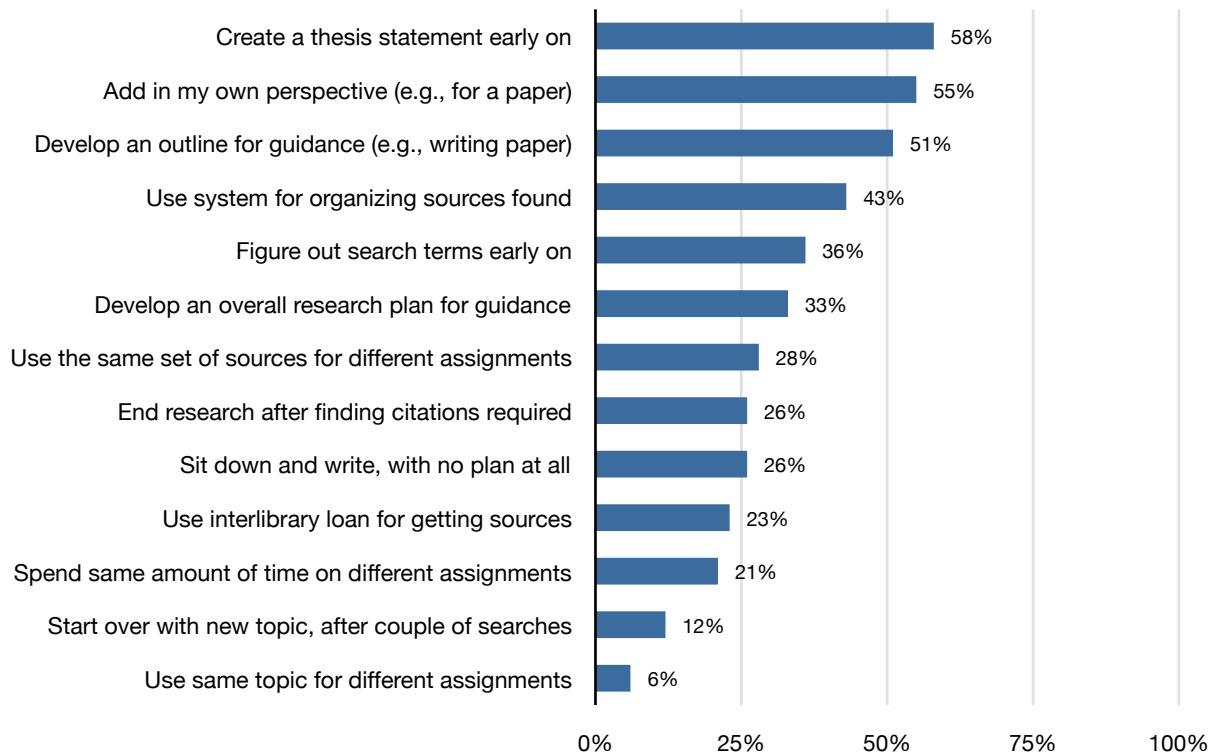
In Figure 10 (on the following page), we rank the techniques, practices, and approaches that students in the sample most frequently used for course-related research.

We summarize the findings, as follows:

1. Over half the students in the sample used routines for carrying out the writing part of course-related research assignments, including crafting a thesis statement (58%), including their own perspective in what they wrote (55%), and developing and using an outline for executing what they turned in to the instructor (51%).

2. Students had fewer techniques for conducting research and finding information than for writing papers. The most frequently used routines included using some organizational system for research materials they had found (43%), creating search terms early on (36%), and developing a research plan about where to look for resources (33%).

   Students had fewer techniques for conducting research and finding information than for writing papers.

3. Routines designed to save time and effort were practiced by a small amount of those in the sample, such as ending a search once the required number of citations for an assignment had been found (26%), allotting an amount of time to complete one assignment to the next (21%), and start over with an entirely new topic if they could not find materials in their first couple of attempts (12%).

4. Few students used routines bent on recycling their previous research efforts, such as using the same journal articles and/or books from one assignment to the next (28%) and using the same topic for different assignments (6%).

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[28] See "What Makes Today's Students Different" on p. 33 in A. J. Head and M. B. Eisenberg (2009). Lessons Learned: How College Student Seek Information in the Digital Age.

Figure 10: Students' Research Styles and Techniques

Research Technique	Percentage
Create a thesis statement early on	58%
Add in my own perspective (e.g., for a paper)	55%
Develop an outline for guidance (e.g., writing paper)	51%
Use system for organizing sources found	43%
Figure out search terms early on	36%
Develop an overall research plan for guidance	33%
Use the same set of sources for different assignments	28%
End research after finding citations required	26%
Sit down and write, with no plan at all	26%
Use interlibrary loan for getting sources	23%
Spend same amount of time on different assignments	21%
Start over with new topic, after couple of searches	12%
Use same topic for different assignments	6%

Results are ranked from most frequent to least frequent for research techniques students reported using during course-related research. Responses of "almost always" and "often" have been conflated into a new category of "frequent use." For the complete data set see Appendix B.

Taken together, these findings indicate half of the students in the sample reported using routine practices from one research assignment to the next. For the most part, the course-related research workarounds students used were geared more toward writing papers than to conducting research and finding information.

In the follow-up student interviews, we asked students about techniques they routinely used and how they had come to learn them.

Student Interviews: Adapt and Survive

How do students routinely apply and use information for completing assignments once they have found it, and where do their techniques originate?

One of the most frequent routines students we interviewed used was going to Wikipedia as a starting point. Nearly half the students interviewed used Wikipedia for the hypertext-linked bibliography at the bottom of most entries for finding sources. Most described Wikipedia as a source to get them started and they definitely continued with their research, often using library databases.

An engineering student said:

> *Once I got used to the Internet, then a lot of times I'll just Google a topic. I don't remember when I started this but I'll start on Wikipedia, read about whatever I'm trying to figure out and then go down to the bottom of that page and look at their references. I can't really tell you how it has even evolved.*

For students such as these their routines were considered to be self-taught. Most of the students we interviewed were not sure where their routines originated, other than from family, friends, or fellow classmates. Most of these students also discussed the impact of the Internet on their research styles for course work.

However, the vast majority of students we interviewed reported their research style originated in high school and was learned from teachers and librarians and later modified. If the research technique worked for them and stood the test of time, students ported the technique to college. Students we interviewed talked about weaving in the basics from high school into their research repertoire for college—and often made few changes.

> **Students we interviewed talked about weaving in the basics from high school into their research repertoire for college—and often made few changes.**

A humanities student offered the following account:

> *I studied in Mexico and high school there is pretty different. Teachers would give you a problem and you would have to do it by yourself. So that type of independence brought me to where I am today. Even though high school was simpler and you didn't have to do as much research, the high school teachers showed me the basics, they showed me I needed a deadline to turn in my stuff, I needed to use encyclopedias, the Internet, books to get my information. That's pretty much what I'm doing now. I look at the possibilities and see which one I can do faster and better. I start doing research first at my house. So if I'm doing research on pandas I'll just to look at Wikipedia and when I go to the library I have stuff I've found at my house and I try to look at it in more detail.*

For other students, high school gave them the foundation for writing papers, but they continued to adapt and modify their routines as they were in college. In a few cases—about 1 in 10—students we interviewed mentioned having learned how to conduct research and find information from campus librarians.

A business administration student explained:

> *Thinking back to high school, I had a couple of really good teachers that were pretty fundamental in giving me my base for writing papers. But I don't think they quite emphasized the research portion of it all enough. In college, I've gotten a lot better job at scouring lots of different sources and finding more information, more thorough information, and counterbalancing arguments, and things like that. The honors research project was a really good. We got to sit down with librarians and go through a search methodology and how you look for sources and how sources link to other sources and how you can use that, which is something that I never even thought about before. Things like just going through a bibliography for a paper that you think will be useful and looking at the sources they've used and so that's sort of what I look at now.*

In the follow-up interviews, we found the majority of students discussed their research styles as a collection of techniques they had learned in high school and adapted and sometimes re-fashioned for use in college, as needed.

In a few cases, the students we interviewed did have a fuller grasp of research as an iterative process. Where did these students learn the process? They learned it from campus librarians.
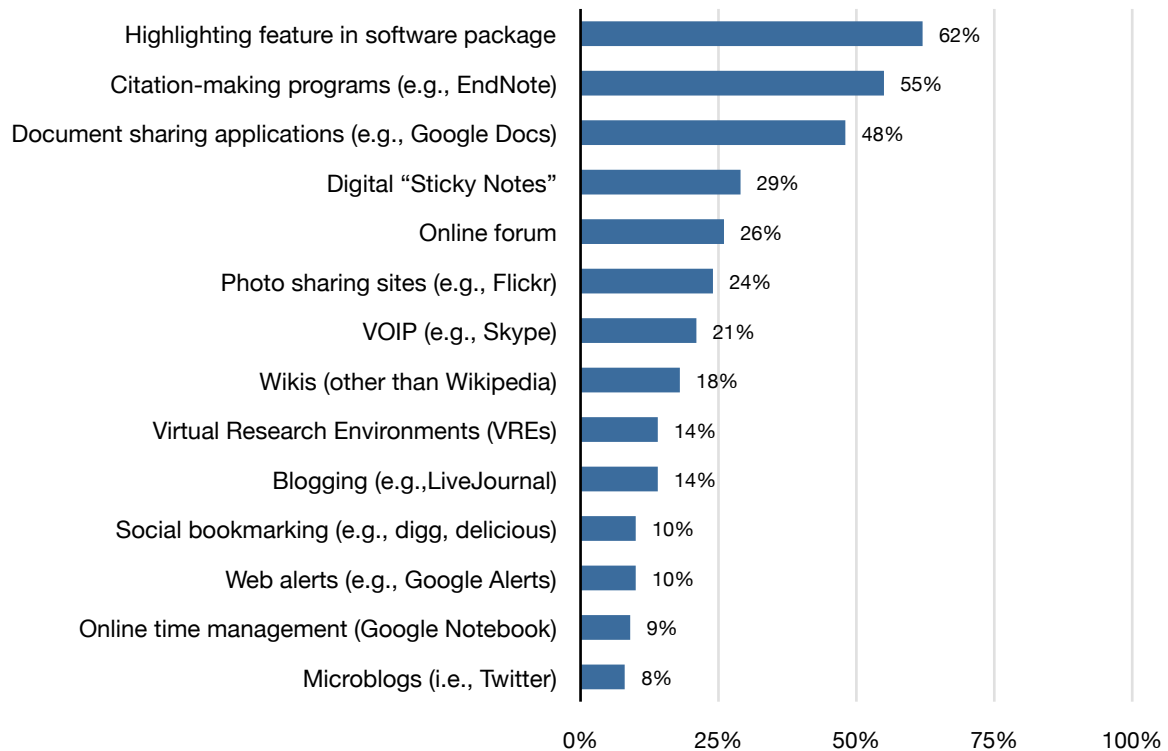
Productivity Tools for Research

As another step in our analysis about course-related research routines, we investigated how often students in the sample used productivity tools for supporting various tasks of their course-related research process.

Some of the data we collected pertained to the use of Web 2.0 programs, including social bookmarking sites, blogs, and wikis within the last six months. For purposes of the survey, we defined Web 2.0 programs as applications that were interactive, running on a Web platform, and used for information sharing and building collective knowledge.[29]

In Figure 11, we rank the tools students frequently used while working on course-related research assignments within the last six months.

Figure 11: Productivity Tools Used for Course-Related Research

Tool	Percentage
Highlighting feature in software package	62%
Citation-making programs (e.g., EndNote)	55%
Document sharing applications (e.g., Google Docs)	48%
Digital "Sticky Notes"	29%
Online forum	26%
Photo sharing sites (e.g., Flickr)	24%
VOIP (e.g., Skype)	21%
Wikis (other than Wikipedia)	18%
Virtual Research Environments (VREs)	14%
Blogging (e.g.,LiveJournal)	14%
Social bookmarking (e.g., digg, delicious)	10%
Web alerts (e.g., Google Alerts)	10%
Online time management (Google Notebook)	9%
Microblogs (i.e., Twitter)	8%

Results are ranked from most frequent to least frequent for research techniques students reported using during course-related research. Responses of "almost always" and "often" have been conflated into a new category of "frequent use" in the last 6 months. For the complete data set see Appendix B.

[29] We are grateful to colleagues at the British Library and JISC, who granted us permission to use and modify their survey question (#12), which was used in their 2010 "Researchers of Tomorrow Survey." The survey was administered to British doctoral students born between 1982 and 1994, in October 2009. The researchers found that "only a small proportion of respondents in any age group say they use 'emergent technology (e.g., Web 2.0 applications) in their research, although most those that do find it valuable," in Researchers of Tomorrow. Interim Report 1 (2009). Summary Report, p. 1. (Accessed September 10, 2010)

We summarize the findings as follows:

1. More students used software solutions, including highlighting text on the screen (62%) and formatting citations (55%) for the solitary management of course-related research tasks as opposed to Web applications for collaborating and working with other students.

2. When it came to Web 2.0 applications, more students used an application for document creation and sharing, such as Google Docs (48%), than they did online forums (26%) photo-sharing sites, such as Flickr (24%), wikis (other than Wikipedia) (18%), and blogging (14%) for supporting course-related research tasks.

3. Few students used virtual research environments (14%), where online tools, processes, and systems exist for managing research projects.

4. Only 1 in 10 students used social bookmarking (10%), such as delicious, for organizing and sharing Web content with others or alerting programs for automated content monitoring.

The data counter the argument that *most* college students are digital natives…

5. Only 8% of the sample of students reported frequently using microblogs, such as Twitter, for managing various tasks associated with their course work.

As a whole, students in the sample were not avid users of Web 2.0 applications for supporting course-related research tasks. The most frequently used Web applications were document sharing Web-based applications, such as Google Docs, available since 2006.

By comparison, relatively few students used popular emergent technologies (e.g., Flickr, Twitter, Delicious) sharing information and collaboratively working on projects together during course-related research.

Instead, students in the sample were frequent users of software productivity tools, such as word processing programs with an on-screen highlighting feature or packages for managing bibliographic citations.

These findings are revealing. The data counter the argument that most college students are digital natives and that the majority of them are comfortable with technology to the point of embracing participatory engaging learning environments.

The finding suggests even though students may be heavy users of social networking sites, such as Facebook, Web 2.0 applications for course research have not yet found their way into students' research repertoire—yet. Recent research suggests that this trend is very likely to change within the next few years as students demand for digital course work and time-shifted instruction inevitably increase.[30]

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[30] See the section on "Online Learners" in The Chronicle of Higher Education's research report, The College of 2020: Students. (Accessed October 20, 2010).

Part Three: Difficulties with the Research Process

> *What makes course research so difficult is the fact that I can't give up on it—it's something I need, something I have to do. But in my personal life, if I don't find something, well, I can forget about it. I don't really need it. If it's something I can't find or if it's something that I'm having trouble finding information on then I can generally just blow it off. But if it's for school, if research is something I need to do—that makes it ten times harder because you have that pressure.*
>
> *- A student in the sciences in a follow-up interview*

In our last section, we turn our attention to the barriers, obstacles, and challenges students encounter as they go through their course-related and everyday life research process.

In our prior research, students in our focus sessions reported that research and finding information was far more difficult to conduct in today's digital age than it was in the past.[31]

In this section of the study, we explore this earlier finding in greater depth. Which parts of the research process are particularly difficult? How do difficulties with research differ for students when they are conducting research for course work as opposed to in their everyday lives?

We use two related analyses to answer these questions. First, we provide a *microanalysis* of the individual steps students reported having difficulty with when conducting course-related and everyday life research.

We also provide a *macroanalysis* of the stages students reported having difficulty with when conducting research for course work and for personal use. In this analysis we present the results of a "difficulties scale" about research stages.

Microanalysis of Research Difficulties

We began our microanalysis by analyzing data about what students found difficult during the individual steps associated with research.[32]

For course-related research, we collected data from 20 survey questions about student's difficulties with research. The difficulties were likely to occur at some point during the research process—from the moment a course-related research assignment is received to when the final results are delivered (e.g., a research paper, a multimedia or oral presentation).[33]

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[31] See conclusions from PIL's report A. J. Head and M. B. Eisenberg (2009). Finding Context: What Today's College Students Say about Conducting Research in the Digital Age. The report presents findings from focus groups with 86 undergraduates on seven U.S. college and university campuses in Fall 2008.

[32] The questions appeared as #12 (course-related research) and #17 (everyday life research) in the online survey instrument we administered. Data was collected from a series of statements about difficulties and respondents were asked whether they strongly agreed, somewhat agreed, neither agreed or disagreed, somewhat disagreed, or strongly disagreed with each statement. Responses for "strongly agree" and "somewhat agree" were conflated into a new category for "agree" in our analysis.

[33] In the survey, we used statements about research difficulties students in our studies had reported having in our prior focus groups and interviews for both course-related and everyday life research. We asked respondents how much they agreed or disagreed with statements (e.g., "Getting started on an assignment is difficult"). We used a seven-point scale for response categories (i.e. strongly agree, somewhat agree, neither agree or disagree, strongly disagree, don't know, and no experience with this situation). We recoded the scale responses (interval variables) into dichotomous (nominal) variables (1: agree and 2: disagree) for reporting the results in Figure 15.

For everyday life research, we collected data from 15 survey questions about research difficulties.

The majority of questions we asked about everyday life research difficulties were similar to those asked about course-related research (e.g., narrowing down a topic, determining credibility, filtering search results). In a few cases, we excluded certain difficulties in this scale, since the previous questions asked were associated only with course work (e.g., taking notes, writing, and citing sources).

What did we learn about students' difficulties with research processes? What did the majority of students in the sample struggle with the most when conducting research for coursework and for use in their personal lives?

We provide two comparative charts where we have ranked the difficulties from most to least frequent for course work (Figure 12) and personal use (Figure 13). First, we provide the analysis of difficulties with course-related research.

Figure 12: Difficulties with Steps during the Course-Related Research Process
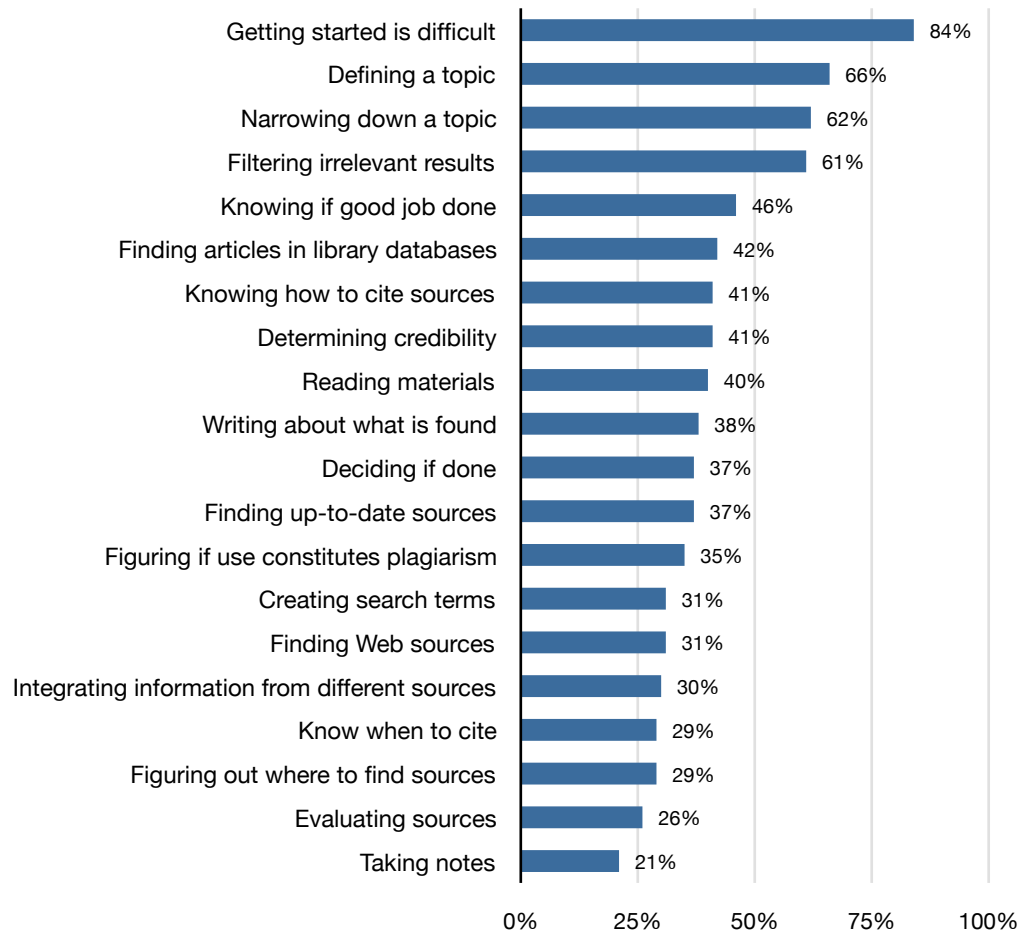
Results are ranked from most to least agreed statements about student difficulties with research. Responses for "strongly agreed" and "somewhat agreed" have been conflated into a new category of "agreed." See Appendix B for complete data sets.

We summarize the findings from our analysis, as follows:

1. Getting started in the course-related research process stymied a large majority of students in the sample (84%) more than any other step in their research process. Other significant challenges occurred toward the beginning of the research process, too, including defining a topic (66%), narrowing it down (62%), and sorting through search results to find relevant materials (61%).

2. Students were perplexed with completing the research process with almost half of the students finding it difficult to decide whether they had done a "good job," or not (46%). Over a third of the respondents finding it difficult to decide when they were finished with the research process (37%).

3. Steps associated with searching for materials were difficult for respondents, but less for finding Web content (31%), creating search terms (31%), and figuring out where to find sources on campus (29%). The most difficult parts of searching were searching library databases, such as JSTOR and ProQuest (42%), and finding current materials (37%),

4. Determining the credibility (i.e., believability) of Web content was more difficult (41%) than generally evaluating print and Web content (26%) for course work, according to respondents.

...almost half of the students finding it difficult to decide whether they had done a "good job," or not (46%).

5. Over a third of the students in the sample reported difficulties with knowing how to cite (41%) and writing about research results (38%) were difficult steps in the course-related research process. And about a third of the respondents (35%) reported it was difficult to figure out if their use of a source constituted plagiarism, or not, when completing course-related research assignments.

6. About a third (30%) found integrating information from different sources and reading through research materials difficult (40%) during the course-related research process.

On the following page, we present Figure 13, which provides the analysis of difficulties with everyday life research.

Figure 13: Difficulties with Steps during the Everyday Life Research Process

Results are ranked from most to least agreed statements about student difficulties with research. Responses for "strongly agreed" and "somewhat agreed" have been conflated into a new category of "agreed." See Appendix B for complete data sets.

We summarize the findings from our analysis as follows:

1. Fewer students surveyed reported having difficulties with finding information for personal use than with course-related research. Respondents reported having the most trouble with sorting through what they had found during a search—separating relevant from irrelevant sources (41%) and deciding when they were finished (23%), even if they were unable to locate the information they knew existed somewhere online (33%).

2. Fewer respondents had difficulties with searching library databases (20%), finding current sources (19%), locating sources (18%), creating search terms (17%), and finding Web content (11%) for everyday life research.

3. Fewer respondents (19%) found it difficult to integrate research materials from different sources difficult when conducting everyday life research and reading through research materials was difficult for relatively few (19%) respondents.

4.   Unlike the findings for difficulties with course-related research, getting started, along with defining and narrowing down a topic, were some of the least challenging parts of doing research for personal use.[34]

As a whole, the findings for this set of analyses give a magnified view of the student research process and the individual steps that most frequently frustrate, challenge, and perplex students.

We found course-related research is almost twice as hard for students as is everyday life research—far more students in the sample reported having difficulties with steps during course-related research (41%) than with everyday life research (21%).[35] This finding does not necessarily mean that students in our sample were more successful with their everyday life research efforts, themselves. However, it may mean they had fewer constraints (i.e., grades time) and were more easily satisfied with results.

> **...far more students in the sample reported having difficulties with steps during course-related research (41%) than with everyday life research (21%).**

In many ways, course-related research could not be more different from everyday life research, especially in terms of some of the challenges they present to students. For course-related research, simply getting started—taking the first step—was the most difficult for more than 8 out of 10 of the survey respondents (84%).

At the same time, for everyday life research, what came as a later step in the research process—the sorting through all the information a search delivered in hopes of finding something relevant—was the most difficult step (41%) for students in the sample. To a lesser extent, knowing an answer was online but not being able to find it (33%) and deciding when they were done looking (23%) were also difficult for respondents.

Macroanalysis of Research Difficulties

In our next analysis, we took a bird's eye view of the same data. This time, we explored students' difficulties with stages—not steps—during the research process by creating two "difficulty scales."

Scales are useful to social scientists because they often provide indicators that are both more valid than a single indicator of a variable, and they make finer distinctions among the values that a variable may take on. [36]

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[34] One explanation for the discrepancies between difficulties for course-related and everyday life research is that research for personal use has far fewer constraints than does course-related research: Someone else rarely sets a deadline for everyday life research, others do not evaluate and judge the results, and personal curiosity is usually the motivating factor.

[35] For this on the average calculation, we added responses for "strongly agree" and "somewhat agree" for each of the 20 survey questions about course-related research difficulties and divided the sum by the total number of responses. We used the same method was used for all 15-survey questions about difficulties with everyday research.

[36] For further clarification, in our previous microanalysis about students' difficulties with research steps, we constructed an *index* and ranked difficulty scores for each of the individual steps of the student research process. In our macroanalysis, we constructed two *scales* (one for course-related research and another for everyday life research) and assigned scores to patterns of responses (intercorrelations) among the variables. We used the same survey data about difficulties in our macroanalysis as in our microanalysis. We created two scales to measure the intensity among variables representing four different stages (task definition, search, use, and assessment) associated with the student research process. For a discussion of indexes and scales, see E. Babbie (2001). *The Practice of Social Research,* 9th ed. Wadsworth, 148 - 174.

We used the scales we created as a way to detect the difficulty of different stages in the research process and to find how this degree of difficulty differed between course-related and everyday life research.[37]

Figure 14 shows the activities associated with each of the four stages of research we have identified.

Figure 14: Dimensions Associated with the Four Stages of Research Process

Task Definition	Search for Information	Use of Information	Self-Assessment
Getting started	Creating search terms	Determining credibility of Web content	Deciding when finished with research
Defining a topic	Finding articles in library databases	Filtering and sorting results	Knowing if a "good job" was done *
Narrowing down a topic	Finding content on the Web	Evaluation of materials (print and Web)	Knowing answer is online but was not found**
	Finding up-to-date materials (online or print)	Reading through materials gathered	
	Figuring where to find sources that may exist	Integrating information from different sources	
		Writing up findings for an assignment*	
		Knowing how and when to cite sources *	
		Knowing if use constitutes plagiarism *	

Only a variable for course-related research analysis.
** Only a variable for everyday life research analysis.

For each stage of research, we calculated a difficulty scale based on the frequencies with which specific responses occurred.[38]

We present the findings as percentages on a comparative chart in Figure 15 (on the following page). We have ranked respondents' difficulties with stages of the course-related research process and everyday life research.

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[37] Since much bibliographic instruction curriculum addresses different stages of the research process, we provide this analysis in addition to the microanalysis of research steps, too.

[38] In our analysis, each respondent ended up with an overall difficulty score for each of the associated research stages. We recalibrated the scores into one of the following five scores: 1-1.79=1 (strongly agree), 1.8-2.59=2 (somewhat disagree), 2.6-3.39=3 (neither agree or disagree), 3.4-4.19=4 (somewhat agree), and 4.2-5=5 (strongly agree) and then calculated the percentage of respondents in the sample who had scores between 4 and 5.

Figure 15: Difficulties with Stages of Research Process
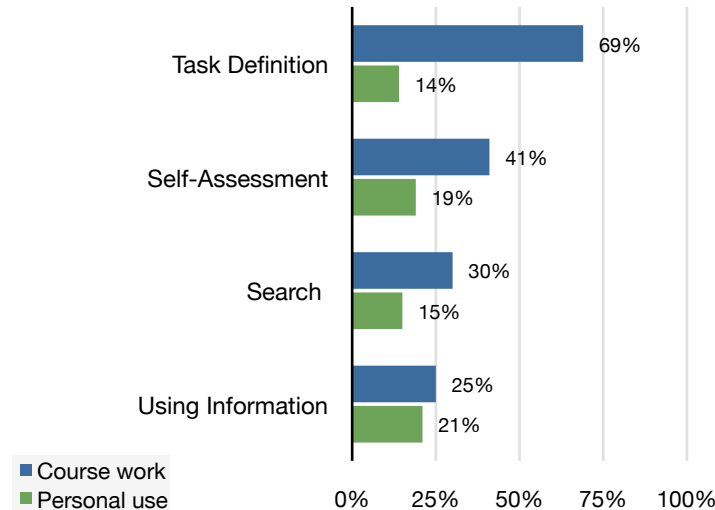
Results are ranked from most to least agreed with statements about difficulties with research stages. See Appendix B, Figures 15A and 15B for complete data sets.

We summarize the findings from our analysis as follows:

1. More students in the sample reported having difficulties defining the task of course-related research—getting started and defining and narrowing a topic (69%)—more than with any other stage for either course-related or everyday life research.

2. Students surveyed had far less trouble with finding information for personal use than with conducting research for course work. The most difficult stage of everyday life research occurred once students found the information they needed and had to apply and synthesize it to the problem at hand.

3. At the same time, the respondents grappled with self-assessment of their research efforts for course work (41%), and less so for everyday life research (19%).

4. Only a third of the respondents (30%) were challenged by the activity of searching for information, including developing their information-seeking strategies and locating and accessing materials and far fewer in the sample (15%) found the search stage difficult when looking for everyday life information.

5. These results from our analysis of stages were inverted—the most difficult stage of course-related research—task definition (69%)—was reportedly the least difficult research stage of everyday life research (14%). The most challenging stage of everyday life research—using information (21%)—was also the least challenging stage of course-related research (25%). The two different kinds of research—course-related and everyday life research—have differences in the number and kinds of the problems and challenges students face.

In a related analysis, we found all four stages (i.e., task definition, search, use of information, and self-assessment) of the course-related research process were reportedly more difficult for sophomores than juniors or seniors in the sample.

We also found respondents studying business administration and engineering had more difficulties with two stages of the course-related research process—search and using information—than did students in arts and humanities, social sciences, or the sciences. Notably, while these differences were statistically significant, the actual difference between their mean scores was quite small for all practical purposes.[39]

As a whole, the findings suggest that students, according to their reports, tend to have far more trouble framing course-related research tasks than they do finding and using information. In our follow-up interviews, we asked students from the sample why the beginning stage of research is so difficult for them.

Student Interviews: Failure to Launch

Two-thirds of the students we interviewed described the first stage of the research process as the most difficult for them. In students' words, why was the beginning stage of research so challenging?

Students did not have trouble coming up with possible topics, but some students were unsure that their topic would meet a professor's expectations. If a topic did not pass muster, difficulties came into sharp focus for some students.

...some students were afraid to commit to a topic for fear the topic would fail them...

According to a student majoring in sciences:

> *Generally, the hardest part is in the beginning because the very first part is finding a topic. I like it when the professor gives you something to write about. It makes the whole first section, that entire part of what you need to find, what you need to get started with your research easier. If it's something that you have to develop on your own, I think it's a lot harder just because you don't know if it's going to be appropriate for that class or if your professor is going to approve of it, if it's good enough, or if it's a good enough topic.*

In other cases, some students were afraid to commit to a topic for fear *the topic would fail them*, not that they would fail in their treatment of a topic when trying to complete an assignment. Students reported difficulties with making a topic manageable before they had even begun.

A student in social sciences explained:

> *I have difficulty narrowing down a workable idea. I guess I'm afraid of being locked into an idea, 'Oh my gosh, what am I going to do if this idea ends up failing and does not work for me?' So I think it's the anticipation, nervousness type thing that scares me in step one. Which is ironic because it's the beginning, it's what you have to do to get started. So I have a lot of difficulty with that sometimes.*

At the same time, students appeared intimidated by information overload and the time it takes to deal with it—a fact most students considered an inevitable reality once their search began.

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[39] For these demographic comparisons, we conducted two one-way between-groups analysis of variance (ANOVA) to explore whether the differences were statistically significant at the $p < .05$ level.

A student in humanities said:

> It would have to be choosing a topic that's the hardest. Because information you can find it pretty much everywhere these days and validating it takes some time—but you can do it. And the rest is simple. I think the hardest part is finding a topic and deciding on something, because there's so much you can do.

Still other students were challenged by the demands of college research, a process that (ideally) requires an iterative investigation and intellectual discovery. Students we interviewed defined research more in terms of being a hunt for two sides of an argument and the ability to recount them, while they chose one side or another to support.

A business administration student explained:

> In my mind there are two types of research projects: One is a completely open-ended, 'You choose your research topic and what you're going to write about' and the other one is 'Here's the question, or the problem, or whatever. Go find and research and find an answer to it.' So the first step is just determining which of those two it is. If it's an open-ended project, you have to figure out the topic, refine it, and get it down to a thesis. Whereas if it's the other kind, say an accounting research project that asks 'Is FASB pronouncement 141 good or bad for X industry?' You obviously have your question; you can just pick one side or the other. Then it involves doing a lot of research, going out there and figuring out, finding both sides of an issue.

For many students, research was not a process of mutable inquiry, but was more of a process of finding and selecting the right topic, given all the information that is available to students in college settings.

According to a social sciences student:

> There's a lot of stuff that interests me and might be a topic that I already have in my mind and I think 'That might be a cool research paper.' But it's also very hard for me to find a valid argument to make and use for a subject that's very new to you. At least for me, research through high school has been to find a topic and you pretty much know what you're going to argue and you find sources to support it. In college, it is more find a topic, ask a question that you legitimately don't know the answer to, and try to find sources one way or the other to find the actual answer somewhere. So trying to find that hypothesis that really works for you, that is broad enough to allow you to write a decent length paper, but also narrow enough so you're not trying to solve world peace—it's very difficult.

All in all, a common thread ran through students' comments, even though students enumerated a variety of difficulties that most certainly arose (or had the potential to arise) during the beginning of the research process for course assignments.

...course-related research was difficult because it was more akin to gambling than completing college-level work.

First, the beginning of research was not difficult because students were short on ideas; quite the contrary. Second, starting on research was not difficult because they were disinterested or unmotivated—a large majority of them were conscientious and in courses to succeed and to learn.

Instead, for many students we interviewed, course-related research was difficult because it was more akin to gambling than completing college-level work. Yes, gambling. The beginning of research is when the first bets were placed. Choosing a topic is fraught with risk for many students. As one student acknowledged in interviews: either a topic worked well or it failed when it was too late to change it.

Add in the constraints of timing, grades, and too much available information to scour—and the difficulties with beginning research are put into high relief. The odds of "winning" this bet are significantly compromised when these factors come into play.

While the survey results indicate the beginning of research was the most difficult stage of course-related research for students, the interviews reveal that research for course work may be the most difficult because of what the first steps signify about the entire research process.

In other words, the first stages of research for course work initiate a process few students thoroughly understand and grasp with much confidence. Few students we interviewed considered themselves wholly competent at completing research for one course research assignment to the next. During the interviews, students reported that research meant finding all the information available about a topic, or in many cases, finding the right answer.[40]

At the epicenter of our investigation into students' research difficulties, our interviews revealed that many students lacked the research acumen to frame a college-level research inquiry into something that was manageable to research and allowed them to complete the entire process.

What Matters Most

We conclude by answering a question we have long wanted to ask: What matters most to students as they are working on a course research paper? In Figure 16 (on the following page), we rank what students found most to least important about carrying out course-related research.

> **Nearly two-thirds of the sample found it important to improve their writing (64%) and research skills (63%).**

Predictably, students in the sample reported that the practicalities work on course-related research assignments were of tantamount importance. Nearly every student in the sample placed importance on passing the course (99%), finishing the paper (97%), and getting a good grade (97%).

At the same time, however, we were struck by the distribution of responses to our survey question. The majority of students in the sample reported that 14 out of 15 of the items in the survey mattered to them while they worked away on course-related research papers. In short, students in the sample reportedly cared about much more than finishing a research paper, meeting the technical requirements of the assignment, and getting a good grade.

In fact, more than three-quarters of the students in the sample considered it important, if not very important, to conduct comprehensive research on a topic (78%) and to learn something new (78%). Nearly two-thirds of the sample found it important to improve their writing (64%) and research skills (63%).

At the same time, over three-fourths of the students (76%) reported that it was also important to find answers to insert in their paper to prove to the instructor the research part of the assignment had been done. This finding lends support to what we found in the student interviews: Many students see course-related research as being "answer-driven."

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[40] In response to Question #11, 76% of the sample found it important to "find answers I can insert into my paper to prove I've done the research," see Figure 16 on the next page.

Figure 16: What Is Important to Students during Course-Related Research?

Category	Percentage
Passing the course	99%
Finishing the assignment	97%
Getting a good grade	97%
Meeting citation requirement	88%
Meeting required page length	88%
Conducting comprehensive investigation of topic	78%
Learning something new	78%
Finding answers to prove research undertaken	76%
Improving analytical skills	69%
Integrating my perspective into paper	65%
Improving writing skills	64%
Improving research skills	63%
Impressing instructor with intellectual abilities	56%
Having chance to be creative	55%
Impressing parents with grade received	39%

Results are ranked from most important to least important factors students have while working on course-related research papers. Responses of ""very important," and "important" have been combined into category of "general importance." See Appendix B for complete data set.

By comparison, the ability to impress instructors with their intellectual prowess was not as important to students in the sample (56%), and they were least interested in using their grade on an assignment to impress their parents (39%).

In a follow-up analysis, we found students in the sample who also found beginning the initial stage of research to be the most difficult also cared about comprehensively researching a topic (78%) and learning something new (78%).[41] This subset of respondents also found that finding answers to use in an assignment (76%) to prove they had done the research was important to them.

As a whole, we conclude from our analysis that while many of the students we studied reportedly struggled to frame their research inquiries, many also mentioned that conducting quality research is important to them.

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[41] We cross-tabulated results from the difficulties scale with results from the task definition scale.

Conclusion

Since 2008, our ongoing research has asked, "what is it like to be a student in the digital age?" To answer this question, we surveyed over 10,000 undergraduates in a series of studies. We also analyzed 191 handouts that faculty distribute to students for research assignments. Additionally, we interviewed over 130 students about how they conceptualize and operationalize research tasks for course work and for solving problems in their daily lives.

Over the course of our efforts, the research became an ongoing study of the gaps we continued to discover across U.S. universities and colleges. Notably, we have seen a gap between the "place-based information sources" that professors most frequently recommend students use for research—i.e., books on library shelves—and what students actually use much of the time—anything online, including the Web and scholarly research databases.[42]

Students use a strategy driven by efficiency and predictability in order to manage and control a staggering amount of information that is available to them in college settings.

We have seen a gap between the plethora of Web sources and the incredibly rich information sources libraries make available to students and the sources that students actually use: a small set of familiar, tried-and-true resources, which infrequently includes librarians, for completing one assignment to the next.[43]

Finally, in this most recent study, we identified the gap between the "resources-focused" training that students may often receive from librarians and instructors and their ability to control and manage the resulting information overload so they can frame a research inquiry and get to work on the assignment with the confidence that they will do well.

Efficiency and Predictability Reign

This year's survey analysis of over 8,300 undergraduates from 25 U.S. institutions is our largest and most comprehensive study to date. The study builds on our ongoing research about how students conduct research and reports striking new results.

Overall, we conclude that many of today's college students, no matter where they are enrolled and no matter what they are studying, adopt a strategic approach to their information-seeking research. Students use a strategy driven by efficiency and predictability in order to manage and control a staggering amount of information that is available to them in college settings. Moreover, students consciously manage their research tasks and activities within the constraints of the course-related research process (i.e., time, grades, professor's expectations).

Nowhere were students' predilections for efficiency and predictability more evident than in a comparison of data from 2010 with the 2009 survey. Specifically, we analyzed how students prioritize their use of information sources, given all that is available to them in the digital age.

When we compared data from our 2009 and 2010 student surveys, we found that the respondents in both samples reported that they use the same small set of sources in the same

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[42] A. J. Head, and M. B. Eisenberg, (2010). Assigning Inquiry: How Handouts for Research Assignments Guide Today's Students.

[43] A. J. Head, and M. B. Eisenberg, (2009), Lessons Learned: How College Student Seek Information in the Digital Age.

order of preference—from most to least often—for finding context and completing research assignments. Course readings, search engines, including Google, and scholarly research databases were used most often. When it came to finding information for use in their personal lives, students most frequently turned first to search engines, such as Google, and to a lesser extent to Wikipedia and friends.

These findings indicate that nearly all students intentionally make use of a small compass for traversing the ever-widening and complex information landscape they inhabit, whether they are finding information for course work or for use in their daily lives. Moreover, once students in this year's sample located sources, the majority reported using a similar combination of routine formal and self-taught evaluation techniques for assessing Web content and to a lesser extent, library materials.

Most often, in terms of evaluation criteria, students considered how current information from the Web and/or the library was when they used sources for course work. When they assessed Web content for personal use in their daily lives, they relied most heavily on a site's design and on how familiar they already were with the site. All in all, students in our sample cast a wary eye on the information they evaluated for use in course work and to lesser extent, in their personal lives.

At the same time, the majority of respondents turned to family and friends for help with sizing up sources for personal use, and to a lesser extent, to instructors for determining the validity and usefulness of sources for course work. The findings from the survey suggest that students take little at face value. Students we studied consciously checked information using a range of formal standards and self-taught methods. We also found that two out of three of students we interviewed considered evaluation essential. In particular, students considered evaluation necessary for scaffolding an assignment's argument and establishing their own credibility as researchers.

> **Students' biggest difficulties were in determining the nature and scope of a research assignment and what it required of them.**

Moreover, half the sample reported using the same repertoire of routine research techniques—mostly for facilitating the writing of papers—in order to complete one course related-research assignment to the next. By comparison, students had far fewer routines for carrying out the research part of assignments. Most students we interviewed explained they had learned and ported research techniques from high school to college; others found that happenstance sessions with college librarians were pivotal to the research techniques they readily used. Few students had used Web 2.0 applications within the last six months for collaborating, sharing, and building knowledge for course work with others.

These results are striking—countering conventional wisdom among many educators and the public—we found students do approach information seeking and research in a consistent and thoughtful, albeit narrow manner.

Scratch the surface and the rest of the results are even more revealing: Even though many students may consider themselves fairly adroit at finding information, especially culled from the Web, and evaluating it, they also reported being hobbled by having to frame a research inquiry for course-related research—before they even begin. That is, students' biggest difficulties were in determining the nature and scope of a research assignment and what it required of them.

Why do students have problems with research assignments? Our findings and the follow-up interviews suggest that students grapple with what college-level research assignments mean and what is expected of them in the process of intellectual discovery. Many students interviewed reported they applied routines from high school learned from teachers and librarians and then modified to complete research for college work.

The students we interviewed had no shortage of ideas for research topics in the first stage of course-related research assignments. Rather, the beginning stage of course research appears to be the most difficult for students because of what it signified about the entire inquiry and research process.

Many students we interviewed conceptualized research as they had in high school: finding an answer from secondary sources, which, ideally, met an instructor's expectations.

Moreover and perhaps most importantly, the proliferation of information in the digital age complicates this conceptualization, since students often think that research entails searching the entire information landscape—until they find "the answer."

Given this strategy, it is no wonder that a course-related research assignment is full of inherent risk for some students and that many have trouble starting the process.

> **Given this strategy, it is no wonder that a course-related research assignment is full of inherent risk…**

Nevertheless, the tangible rewards of passing the course, finishing the assignment, and getting a good grade were naturally most important to students. Yet, so were the educational outcomes of the college level inquiry and research process—conducting comprehensive research and learning something new. We conclude that many of the students we studied were inquisitive and deeply concerned about learning.

Recommendations

The learning taxonomy of lower- and higher-order thinking skills may be a useful lens for interpreting this year's survey results and organizing our recommendations.[44]

By lower-order thinking skills we mean the procedural memorized routines, techniques, and rules for conducting research and finding information. Higher-order thinking skills involve interpreting, synthesizing, and creatively manipulating abstract concepts to generate new constructs, meanings, interpretations, and knowledge. Both types of thinking are essential to information literacy and both are necessary for lifelong learning.

The survey findings suggest that the students in our sample considered themselves fairly adept at lower-ordering thinking skills for research: checking the publication date of an article for evaluative purposes, finding citations for other sources in a bibliography or at the bottom of a Wikipedia entry, writing a paper from an outline, coming up with search terms, and so forth.

At the same time, the findings suggest that the students in our sample considered themselves to be at a great disadvantage when asked to apply some of the higher-order thinking skills for information seeking and research, especially starting, defining and narrowing a research inquiry so it framed their entire research process.

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[44] The Association of College and Research Libraries (ACRL) discusses the need for recognizing different levels of thinking skills associated with teaching and learning information literacy outcomes and credits Bloom's Taxonomy of Educational Objectives. According to ACRL, lower-order thinking skills are associated with standards for devising and using an effective search strategy, while higher-order thinking skills are associated with synthesizing information "to create new concepts." See ACRL's Information Literacy Competency Standards for Higher Education for more information (accessed September 7, 2010).

Our research seems to indicate that college students who have the most trouble with conducting research may not fully understand what research as a process of intellectual discovery requires of them and the higher-order thinking skills it demands. [45]

We conclude that both higher- and lower-order thinking skills are more necessary than ever for conducting quality research and solving information problems. In the digital age, the availability of information far outweighs the ability to conduct exhaustive research on most topics.

Evaluation, interpretation, and synthesis are key information competencies of the 21st century.[46] They allow us to find the information we need, to filter out the information we do not need, and to navigate the present and future information landscape.

We make four recommendations for working with and teaching today's students. These recommendations are based on our findings and intended to inform pedagogies for a new century, especially as they apply to teaching and training students to develop viable information-seeking strategies and the process of intellectual discovery for use now and in the future.

While our findings may not be generalizable to college settings everywhere, we hope that our recommendations will resonate with faculty, higher education administrators, librarians, as well as commercial interests providing educational materials, resources, and systems (e.g., publishers, textbook as well as trade, database providers, and technology companies).

1. *Integrating research rubrics into assignment guidelines*: In our survey sample, students struggled the most with initiating course-related research assignments. Defining a research inquiry is the fundamental research competency for completing college course assignments—yet it stymied over two-thirds of the students in our sample. Despite our concerns with this result, we also see it as offering an interesting opportunity, especially for helping students learn about what information seeking and research require as a knowledge-producing process and for giving students a way for assessing their own performance when conducting course-related research.

    We support the development and widespread use of comprehensive research rubrics—a set of criteria about what quality course-related research entails that is part of the research assignment that are first assigned. While we acknowledge that research rubrics do exist in some settings we call for further development of research rubrics to include criteria from faculty, writing centers, and centers for teaching and learning.[47] Moreover, we suggest librarians take this charge to jointly develop a comprehensive research rubric. We believe a joint effort with key campus-wide stakeholders would integrate essential standards about how to conduct quality research—from start to finish.

    > **We support the development and widespread use of comprehensive research rubrics…**

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[45] We wholeheartedly admit that higher-order thinking skills are more difficult than lower-order thinking skills, but our findings suggest students do not understand the higher-order thinking tasks for carrying out college-level research assignments, regardless of whether or not they find them difficult to learn and practice.

[46] For more of this discussion see M. B. Eisenberg, (2008). Information Literacy: Essential Skills for the Information Age. *DESIDOC Journal of Library & Information Technology,* 28, (2), 39 – 47 (accessed on June 1, 2010).

[47] See the ACRL's Research Rubric, which is a rubric for assessing research papers that is based on information literacy standards and written by librarians. (Accessed on October 6, 2010.)

2. *Re-thinking resource-focused librarian training.* In a recent phone conversation, a research liaison in the PIL sample said something that gave us pause. Commenting about library instruction she said, "just think, by the time a freshman becomes a senior, we have added hundreds of new databases to our collection, among many other things, so the collection we taught students to use as freshmen may be very different." Indeed. In this study, we found students we studied actually developed an information strategy to head off complex information landscapes that change and grow. Our findings suggest that most students—not all—use a strategy that tries to manage and control –yes, limit—all of the information that is swimming in front of them when they sit down at a computer and try to find research sources for a paper due in three or perhaps four days. What's a librarian to do?

    We believe library instruction could benefit from some serious rethinking and re-examination. We recommend modifying sessions (in-class and reference encounters) so they emphasize *research process*—framing a successful research process—over *research-finding of sources*. We are not saying *all librarians* provide this latter kind of resource-focused training—but we know that many do. Based on our findings, we think it is essential for librarians to teach and train students about developing and honing a research strategy with some assurance, on the students' part, that quality research is being conducted. We would like to see instructional training include more questions about developing a research strategy: How should you begin to frame your research assignment? What are good sources for presearching[48] something you know nothing about? How does presearch give you context for continuing your research process? Simply put, we are proponents of rethinking and revitalizing library instruction so it gives students guidance for overcoming what many reported was the most difficult part of the entire process—getting started and developing a topic that carries them through the entire research process, in addition to using the best sources.

3. *Holding students more accountable for the research they do conduct:* In several follow-up interviews, students told us they preferred research assignments where a professor narrowed down and specified a research topic for them. Students often ask their professors to assign research topics for them. This is just the tip of the iceberg of a larger issue about how students come to learn what is required of them from college-level research assignments. We recommend that professors consider giving research assignments that require students to use the cognitive activities of defining a topic and narrowing it down. Faculty need to think carefully about the learning goals and means of their assignments—beyond subject or content— and focus on substantively helping students to learn and practice research skills.

> **Moreover, instructors should emphasize the research process and hold students accountable for the research that they do conduct.**

Moreover, instructors should emphasize the research process and hold students accountable for the research that they do conduct. For example, students could be given assignments that ask them to substantiate their search strategy, evaluation, and selection of resources and show hard evidence of critical thinking about information. One direct way to accomplish this is to require an annotated bibliography with assignments in which students explain why a source was selected and used. At the

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[48] In our 2008 student focus group sessions, participants discussed going through a "presearch" stage during course-related research, which was a stage that involved thinking about a topic (even "stewing"), seeing what had been published about something, before moving on to what students called, their "more serious research." A majority of students in our sessions reportedly used Wikipedia during their presearch stage. See A. J. Head and M. B. Eisenberg, (2009), Finding Context: What Today's College Students Say about Conducting Research in the Digital Age, p. 12.

same time, we are reminded of our "Smart Talk" interview with Andrea Lunsford, who heads the Program on Writing and Rhetoric at Stanford. Professor Lunsford tells us the most difficult assignment she gives is "Texts in Conversation."[49] Students are asked to find and select several sources that are very important to their research topic and write an essay that, in Lunsford's words, "brings them into conversation with one another, probing where they agree and disagree and setting them in the larger research conversation surrounding the topic." According to Professor Lunsford, the *research assignment about research* leads students to write a more thoughtful argument-based paper for the end of the course. We concur. The assignment gives students practice with higher-order thinking skills about critically selecting and evaluating sources.

4. *Assessing how students are being prepared for the 21st century workplace:* Our work leads us to see a widening gap between the information-seeking systems today's students use and the information-seeking systems the academy most readily supports (as communicated through assignments, support materials, and curriculum). In a study we released this year about handouts instructors use for course-related research assignments, we found six out of 10 handouts recommended that students consult library shelves—a place-based source—more than online library sources and the Web, even though most students use these sources more often.[50] In this study, few students had used Web 2.0 applications within the last six months for collaboratively creating and sharing knowledge for course work (beyond Google Docs). Yet, 70% of this year's sample of students frequently turned to social networks, such as Facebook, for solutions to information problems in their daily lives.

The main point? Today's students have systems for finding and using information the academy often disregards, or in some cases, even prohibits (e.g., Wikipedia). What concerns us is that the systems students are using are increasingly becoming the basis of what is being used for finding information and collaborating, sharing, and creating knowledge in many workplaces. Many institutions may be unwisely out of step with how information is manipulated and used in today's world.

As a result, we recommend the initiation of a dialog among administrators, faculty, and librarians across the academy about the information systems being advanced on their campuses. How are graduates being prepared to use information and navigate today's and tomorrow's increasingly complex information landscape? Is the campus graduating students with the necessary information literacy competencies for the 21st century workplace? Whether, and by how much, the gap is narrowed is, of course, a separate issue. However, it is important to identify whether a gap of concern exists, and if so, how it needs to be addressed through policy, supported computing applications, training and outreach, curriculum development and most importantly, working together toward a solution with campus stakeholders, including librarians, faculty, writing labs, and administrators.

> **Today's students have systems for finding and using information the academy often disregards, or in some cases, even prohibits (e.g., Wikipedia).**

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[49] "Andrea Lunsford: Writing and the Profound Revolution in Access," Project Information Literacy, Smart Talks, no. 2, July 12, 2010.

[50] See A. J. Head, and M. B. Eisenberg, (2010). Assigning Inquiry: How Handouts for Research Assignments Guide Today's College Students, 10-13.

Furthermore, this conversation should be extended beyond the academy as well. Our findings indicate that students develop during their high school years a somewhat narrow set of approaches and techniques to information gathering and research. Therefore, developing higher level, more independent, creative problem-solvers in college should begin with engaging K-12 educators—including teacher-librarians—in building in more systematic and measured instruction and learning of research and information skills in high schools, or earlier.

Lastly, we also believe that our findings have serious implications for the education information industry (publishers, software and hardware producers, etc.). Our findings that today's students do not yet rely heavily on Web 2.0 capabilities points to future opportunities rather than current limitations. Publishers and educational systems and resource providers can be active partners in developing valued, college-level learning skills as well as content.

Appendix A: Methods

The Project Information Literacy Team administered a survey to 112,844 students on 25 U.S. campuses between April 6, 2010 and May 18, 2010. The survey ran for two weeks on each campus in the sample. One email reminder was sent to non-respondents after the first week of the survey launch.

The 22-item survey was administered online, using the University of Washington's (UW's) WebQ software and a secure file server on the UW campus, set up for collecting and storing survey research data.

Before the launching the official survey, we pre-tested its wording and functionality with seven undergraduates who were enrolled in two institutions that were not in the study sample (i.e., St. Mary's College of California and UCLA). Minor revisions were made for wording and clarity of two questions and in the overall functionality of the instrument.

Data Cleaning and Response Rates

Before data cleaning, we had a total sample of 8,445 responses, which resulted in a 7.9% response rate. However, we conducted two phases of data cleaning during analysis, which reduced our sample size. In the first round of data cleaning, we eliminated all freshmen, since they were not part of our study population.[51]

In the second round of cleaning, we removed a survey response if there was a large percentage (> 70%) of missing responses from a respondent. We also removed the entire survey if a respondent reported having little experience with conducting course-related research for humanities and social science courses, as a "write in."

After both rounds of data cleaning, our final sample size (the one used in this report's analysis) was 8,353 responses. The overall response rate was 7.4%.

Research Liaisons

We asked geographically diverse institutions to volunteer for the study. The institutional study sample was made up primarily of public four-year institutions (84%), and to a lesser degree private four-year institutions (15%) and one community college (1%).

In order to facilitate data collection on each campus, we enlisted research liaisons who were already employed at the campus where the survey was administered. Liaisons' job titles ranged from library deans and directors to information literacy and reference librarians.

Liaisons were instrumental in two ways: (1) helping PIL obtain access to contacts on campus, PIL needed internal review board approval, and (2) helping PIL obtain access to the Registrar's Office in order to request an email database of students were eligible to take the survey.

Appendix A, Figure 1 shows baseline information for each institution.

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[51] We have excluded freshmen from our ongoing research at PIL, to date, since this demographic group's research habits and practices are often "too new" to college to have routines, habits, and strategies for college-level work.

Appendix A, Figure 1: Institutions in the Spring Survey Sample 2010

	PIL Research Study Liaison	Number of Surveys Deployed	Opt-outs, Bounce Backs	Returned Surveys (Pre-cleaning)	Response Rate per Campus	Data Cleaning, Phase 1 (Freshman Deleted)	Sample Size after Data Cleaning 1	Final Sample Size after Data Cleaning 2
Univ. of Arizona	Jill Newby, Library	6300	11	259	4%	0	259	257
Boise State Univ.	Sara Seely, Library	1500	3	205	14%	4	201	197
Cal Maritime	Michele Van Hoeck, Library	550	12	59	11%	0	59	59
Colgate Univ.	Clarence Maybee, Library	1972	0	409	21%	0	409	406
College of William & Mary	Paul Showalter, Library	4321	1	723	17%	17	721	710
Colorado State Univ.	Cathy Cranston, Library	10,000	0	818	17%	41	777	767
Corban College	Garrett Trott, Library	430	2	150	35%	0	150	148
Eastern Michigan Univ.	Suzanne Gray, Library	3532	1	150	4%	16	134	133
Felician College	Paul Glassman, Library	1176	23	38	3%	5	33	33
Gettysburg College	Kerri Odess-Harnish, Library	2410	14	351	15%	84	267	265
Holy Names Univ.	Karen Schneider, Library	185	0	23	12%	1	22	22
Linfield College	Jean Caspers, Library	1153	2	258	22%	17	241	241
New Mexico State Univ.	Theresa Westbrock, Library	10,717	7	497	5%	0	497	495
Northern Kentucky Univ.	Stephanie Henderson, Library	6158	13	462	8%	4	458	443
Northern Michigan Univ.	Mollie Freier, Library	4699	4	337	7%	11	330	330
Ohio State Univ.	Nancy O'Hanlon, Library	7500	11	417	6%	51	366	366
Purdue Univ.	Sharon Weiner, Library	10,000	0	439	4%	32	407	403
St. Mary's College of Maryland	Celia Rabinowitz, Library	1950	90	255	14%	58	197	196
Southern Nazarene Univ.	Arlita Harris, Library	784	1	128	16%	6	122	121
State College of Florida Manatee-Sarasota (CC)	Mark Marino, Library	3090	0	117	4%	43	74	72
Temple Univ.	Krystal Lewis, Library	4000	4	223	6%	9	214	212
Univ. of Michigan	Doreen Bradley, Library	12,000	15	949	8%	3	946	922
Univ. of Minnesota	Kate Peterson, Library	3932	4	572	15%	79	493	489
Winston-Salem State Univ.	Julie Dornberger, Library	4485	10	400	9%	7	393	386
West Virginia Univ.	Carroll Wilkinson, Library	10,000	11	687	7%	7	680	674
		112,844	239	8925	284%	480	8445	8347* (8353)
					7.9%			**7.4%**

* The final sample size was 8,353 responses overall; 8347 appears in the final column because there were 6 missing responses in the data used for institutional affiliation in our final tally.

A PIL Project Resource Web site was set up for research liaisons to access study materials (i.e., press releases, celebrity endorsement text, poster templates, and technical details for white listing IP addresses). The PIL team worked with research liaisons to publicize the survey on campuses.

We used several methods to spread awareness about the survey on each campus: (1) putting up PIL posters announcing the survey around campus; (2) posting a brief reminder about the survey on the campus and/or library news Web page; (3) posting a brief reminder on Blackboard or other online course management systems; and/or (4) having "celebrity endorsement" (e.g., a library director or campus provost) sent in the email invitation to students for study participation.

Description of the Student Sample

We used two different techniques to sample students. At institutions with small enrollments (under 2,000 students), we sampled the entire student population. At institutions with larger enrollments, such as public universities, we used a random sub-set of the undergraduate student population in order to limit the impact on institutional servers handling the survey.[52]

According to our results, more females (65%) took the survey, than males (35%). (However, we did not intentionally try to balance our sample for gender.)

More students who were 21- or 22-years-old (44%) took the survey than any other age group. Interestingly, this means that many students in our sample were born in 1989—the same year Tim Berners-Lee, a researcher at CERN, wrote his initial proposal for the World Wide Web. Appendix A, Figure 2 shows a breakdown of the sample by age.

Appendix Figure 2: Range of Age for the Sample

n = 8,314

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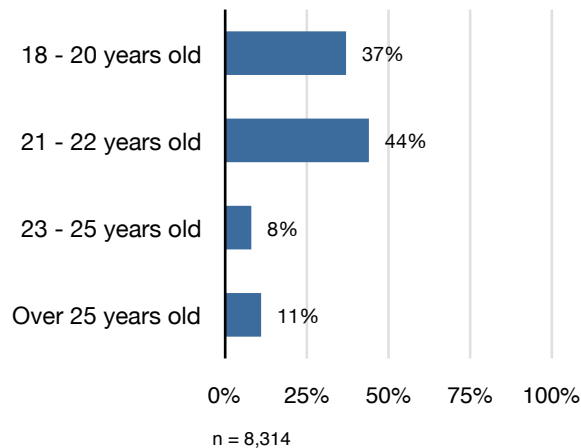
[52] For example, Ohio State University (OSU) has an enrollment of 41,000 students. PIL sent out survey invitations to a sub-sample of 7,500 randomly selected students, which was provided by OSU's Registrar's Office.

The largest category of responses comprised students who were seniors (40%), though juniors (33%) and sophomores (27%) were also represented in the sample.

We collected data from students about their disciplinary areas or majors and conflated majors in broad terms for data analysis (i.e., arts and humanities, social sciences, sciences, engineering, business, and occupational training).

Students studying in arts and humanities (21%), business administration (11%), engineering (11%), social sciences (28%), and the sciences (28%) made up the sample. Appendix A, Figure 3 shows the sample by disciplinary area.

Appendix A, Figure 3: Major Areas of Study for the Sample

n = 8,353
Note: 1% of sample were double majors and not included in data analysis
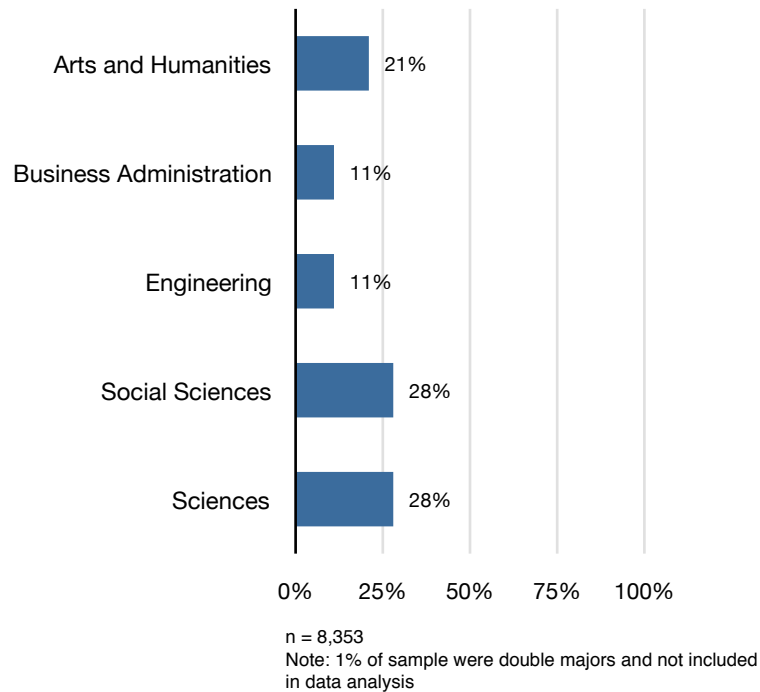
We also collected data about students' grade point average (GPA). The most frequently reported (i.e., the mode) GPA for the sample was the category for 3.4 and 3.7. As a point of reference, we calculated this grade point average as being between a B+ and an A-.[53]

Appendix A, Figure 4 (on the next page) shows a breakdown by GPA for the sample.

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[53] For purposes of our analysis, we employ University of Washington's scale for translating GPA to letter grades, courtesy of the Office of the Registrar, http://www.washington.edu/students/gencat/front/Grading_Sys.html, accessed online on August 10, 2009.

Appendix A, Figure 4: Grade Point Average (GPA) for the Sample

GPA Range	Percentage
1.7 - 2.0	1%
2.1 - 2.3	2%
2.4 - 2.6	5%
2.7 - 3.0	17%
3.1 - 3.3	21%
3.4 - 3.7	33%
3.8 - 4.0	19%
Declined to State	2%

n = 8,353
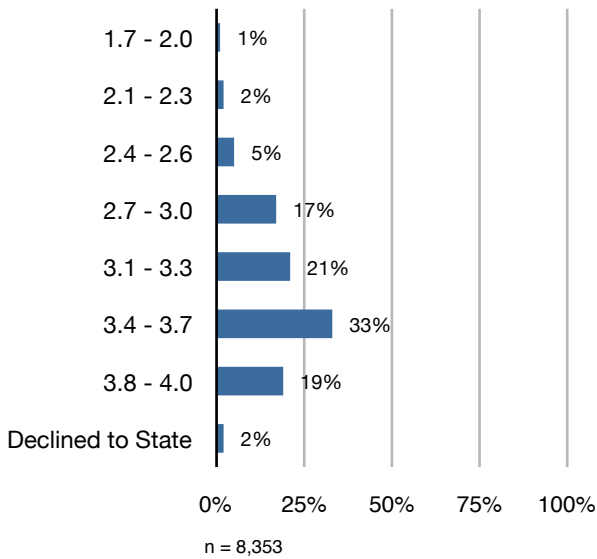
Taken as a whole, the sample was limited in the number, nature, and range of participants. We fully acknowledge that voluntary participation always introduces a certain amount of inherent bias, as do "self report" data collection methods, such as the ones used in our research design.

Where it was possible, we made a concerted effort not to recruit a sample through library connections in order to avoid bias in the answers we received.

In communication with students, we described the study as "a national research study about being a student in the digital age," not as a study of how students conduct research, use library resources, and other sources.

Incentives for Students' Time

In exchange for their time, survey respondents were invited to enter a PIL drawing for a $150 Amazon.com e-gift certificate.

A gift certificate was awarded on each campus to one respondent who entered the contest and was randomly selected as the winner. If respondents did not fill out the survey itself, but did enter the contest, they were still eligible to win.

Human Subjects Review and Confidentiality

The Human Subjects Division at University of Washington (UW) approved our research protocol on March 5, 2010 (Certificate #38178). UW is affiliated with PIL as the sponsoring institution for Project Information Literacy.

UW's Human Subjects' reviewers certified PIL's survey project as "exempt," due to the no-risk nature of the research methodologies we used to collect data and guarantee confidentiality.

As a matter of course, the research protocol was submitted and approved at each of the 25 institutions at which data was collected from students. On two campuses in the sample, the PIL protocol also underwent a separate FERPA review.[54]

All measures were used to protect any identifiable data (e.g., each participant was assigned an identification code; all responses and code keys were stored separately in locked files or on secured computers). No participants or individual institutions were identified in any reports of the research.

Moreover, survey contest winners were contacted by cell phone; no additional contact information about the respondents was collected (e.g., street address) to preserve their anonymity.

Survey Design and Purpose

The purpose of the PIL large-scale student survey was to collect quantitative data about early adults' research approaches, practices, and styles, including sources used, methods for evaluation, and challenges encountered during the research process.

Our ongoing goal at PIL is to release practical and applicable findings, which inform an understanding of the student research process, especially what students experience when conducting research, for use by librarians, faculty, and administrators.

Ideally, we hope for direct value to numerous constituents in academic settings, including professors, librarians, and administrators, who may also be trying to impart information literacy skills, standards, and competencies to a growing population of students, who are heavily influenced by the convenience of a Google search and the ubiquity of the Web.

At the same time, we make no claims that data from this study and subsequent findings from our student survey are generalizable to larger populations, or beyond the sample in our study.

In our work at PIL, we have chosen to study the relationships between variables of interest to us and our objectives. In our 2009 student survey, for example, we studied whether the relationships were robust between using course readings and finding big picture language, situational, or information-gathering contexts.

While fully acknowledging that further research is required to confirm any of PIL's findings, especially in terms of generalizing to the full college population, the data we have collected, the response rates, and the data analysis applied and reported has shown consistent responses and fairly robust relationships.

We have also found, as part of our ongoing research, that these relationships have been validated with different samples of students (as we present in the Part One of findings in this report).

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[54] The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records. In the case of the PIL study, the FERPA review was conducted because an institution was providing PIL with student email addresses from their campus for PIL's one-time recruiting of the sample.

Research Questions of Ongoing Study

The survey's purpose for PIL is as an integral part of collecting data to begin answering PIL's overarching research question: In the digital age, how do early adults conceptualize and operationalize course-related research and research for solving information problems related to their daily lives?

The trajectory of our ongoing research has been to answer the following research questions:

1. How do early adults define and conceptualize the process of research (i.e., both course-related and "everyday" research")?

    a. What does the activity of research mean to early adults (in their own words and from their own experiences)?

    b. What barriers and obstacles keep early adults from taking the first steps in both the course-related and everyday research?

2. What steps do early adults take to locate, evaluate, select, and use resources required for course-related and everyday research?

    a. What processes do early adults employ and what "workarounds" have they developed for evaluating and selecting resources?

    b. How do early adults engage in collaborative information problem- solving about conducting course-related and everyday research?

    c. How do early adults use peer-to-peer "socially constructed" digital resources (e.g., Wikipedia, course wikis, and/or blogs) when conducting course-related and everyday research?

    d. How do early adults determine if peer-to-peer resources are credible and reliable sources of information for course-related research assignments and/or for everyday research, if at all?

    e. How do early adults' strategies for conducting course-related research vary from the search for information about everyday problems?

    f. How do early adults' strategies systematically vary within the population of institutional settings (i.e., community colleges vs. state colleges and universities and private colleges and universities)?

    Ultimately, findings from PIL will have considerable impact on the understanding of information literacy in five major areas:

    1. How information literacy education and coaching are provided to early adults by professors and librarians for conducting course-related and everyday research.

    2. How a college curriculum that requires course-related research and everyday research is developed and communicated to early adults.

    3. How the design of online resources used by campus libraries and produced by database vendors, enhance or detract from early adults' research experiences.

4. How (and to what extent) different types of institutions impact the information-seeking strategies of their early adults.

5. How to improve the understanding of the problem-solving potential of current U.S. college students who are an important subset of the "adult" cohort, given their unprecedented enrollment, their professional destinies, and their likelihood to have "grown up digitally."

Follow-Up Interviews

Many of the results from our analyses provided some answers about students' use of sources and the particular obstacles and challenges they faced with both course-related and everyday life research.

At the same time, our quantitative data raised new questions, as our analysis often does. As a method for addressing some of these questions, we conducted follow-up interviews with students in our sample who had volunteered their time (n=25). Our interviews are meant to add qualitative data and texture in support of our quantitative data analysis.

The sample was segmented along four lines: (1) respondents with high (4.0) vs. low GPA (2.4), (2) disciplinary area of study, (3) frequent vs. infrequent librarian usage, and (4) specific difficulties with course-related research.

Each interview was conducted by telephone and lasted between 15 to 30 minutes. The interviews were recorded and interviewees were asked for their permission to record. An audio file of 8 hours and 10 minutes was the end result. A script with seven open-ended questions was employed as a guideline for the conversational interviews with participants. The same interviewer was used throughout for consistency.[55] The interview questions were as follows:

Q1a. Tell us a little about the research assignments you have done in the last year, or so, for one of your humanities or social science courses. How about research you have done for use in your daily life, for your personal use?

Q2a Let's talk about research for research papers or other course assignments—the kinds of assignments that require you to find "outside sources" for say, a humanities or social science course. How do you evaluate the quality of information you have found for course work? That is, what do you consider about a source when you are deciding to use it, how do you know if the information is "good" to use, or not, whatever that may mean to you?

Q2b. How much time and effort would you say you spend evaluating materials for course work: a lot, a little? How much time do you spend (i.e., percentage of time spent on evaluation in relation to all of the time you typically spend on course-related research assignments from start to finish)? What requires more evaluation: sources from the Web or sources from the library? Do you think evaluation is an important step in your research process--do you need to always evaluate sources you've found?

Q3. How often do you consider how current a source is, that is, when it came out or was published, when you are evaluating sources for course work? If yes, why does currency matter to you? In terms of time, how would define what makes a source "current," that is how up to date would you say sources need to be for course work?

Q4. How about research for use in your daily life, apart from school—how much time and effort do you put into evaluation of information you for personal use? What do you consider? How do you know if the information you find is good quality, or not? Do you ever look at the Web design of a site when you are evaluating its quality? If yes, what would say a site's design can tell you?

Q4b. Do you ever ask someone—another person—for help with judging whether a source has good information, or not? Who? Why?

Q5. Now, let's talk about challenges, troubles, or difficulties you may have with the entire research process—from the start to the finish—all of it. First, what would you say is more difficult for you—conducting research for course research assignments, or conducting research for use in your personal life?

Q5a. What would you say is the most difficult part of course-related research? I'm going to give you four stages to choose from: (1) the beginning, when you choose and define a topic, (2) finding information, (3) sorting through and evaluating information, or (4) thinking about the whole process and what you found and whether it works for you?

Q5b. What would you say is the most difficult part of everyday life research? I'm going to give you four stages: (1) the beginning, when you choose and define a topic, (2) finding information, (3) sorting through and evaluating information, or (4) thinking about the whole process and what you found and whether it works for you?

Q6. How do you know if you've done a "good job" conducting research, whatever that may mean to you, given your needs, when you conduct research for finding information? How about everyday life research; how do you know if you've done a "good job," whatever that may mean to you, when you research something to use in your personal life?

Q7. Lastly, think about when you are working on course-related research assignments. Are there certain course-related research routines, techniques, or workarounds you use from one research assignment to the next one with regard to how you research a topic and prepare the final assignment? Do you remember when you first started using these techniques and where you heard about them? Have you adapted and changed them over time?

Appendix B: Complete Data Sets

Appendix B, Figure 5A: Criteria for Evaluating Web Content for Course Research

WEB EVALUATION TECHNIQUE: Course Related-Research	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Currency (i.e., content's timeliness)	3316 40%	3060 37%	1417 17%	360 4%	102 1%	13 --	32 --	8300 100%
Author's credentials	3501 42%	2571 31%	1400 17%	556 7%	211 3%	18 --	36 --	8293 100%
URL (i.e., Web site or page address/domain)	3617 43%	2321 28%	1337 16%	609 7%	313 4%	41 1%	46 1%	8284 100%
Interface design	3262 39%	2640 32%	1528 18%	509 6%	225 3%	64 1%	51 1%	8279 100%
Linkage (if links exist to other Web sources)	2209 26%	3320 40%	2077 25%	472 6%	146 2%	30 --	41 1%	8291 100%
Familiarity with site from previous usage	2061 25%	3092 37%	2179 26%	626 8%	225 3%	29 --	37 1%	8251 100%
Heard about site before	2074 25%	3068 37%	2210 27%	650 8%	222 3%	27 --	41 1%	8294 100%
Charts (if charts exist, their value)	2140 26%	2890 35%	2062 25%	716 9%	219 3%	57 1%	193 2%	8277 100%
Author gives credits to sources used	2335 28%	2584 31%	1997 24%	950 12%	333 4%	26 --	48 1%	8273 100%
Different viewpoints represented	2157 26%	2725 33%	2303 28%	813 10%	219 3%	29 --	48 1%	8294 100%
Bibliography included	2005 24%	2512 30%	2126 26%	1153 14%	403 5%	27 --	46 1%	8272 100%
Librarian referral about source	814 10%	1270 15%	1624 20%	1793 22%	1775 21%	136 2%	857 10%	8269 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 5B: Criteria for Evaluating Web Content for Everyday Life Research

WEB EVALUATION TECHNIQUE: Everyday Life Research	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Interface design	1894 23%	2710 33%	2202 27%	795 10%	366 5%	79 1%	87 1%	8133 100%
Familiarity with site from previous usage	1519 19%	2880 35%	2508 31%	720 9%	361 4%	53 1%	79 1%	8120 100%
Currency (i.e., content's timeliness)	1863 23%	2507 31%	2300 28%	992 12%	390 5%	51 1%	78 1%	8181 100%
URL (i.e., Web site or page address/domain)	1710 21%	2266 28%	2214 27%	1198 15%	608 8%	71 1%	81 1%	8148 100%
Author's credentials	1595 20%	2245 28%	2449 30%	1254 15%	470 6%	48 1%	75 1%	8136 100%
Heard about site before	1151 14%	2441 30%	2670 33%	1060 13%	638 8%	76 1%	97 1%	8133 100%
Linkage (if links exist to other Web sources)	1100 14%	2386 29%	2867 35%	1228 15%	434 5%	62 1%	82 1%	8159 100%
Different viewpoints represented	1339 16%	2152 26%	2598 32%	1400 17%	529 7%	67 1%	78 1%	8163 100%
Charts (if charts exist, their value)	1140 14%	2021 25%	2595 32%	1529 19%	638 8%	75 1%	145 2%	8143 100%
Author gives credits to sources used	956 12%	1584 20%	2428 30%	2051 25%	949 12%	78 1%	78 1%	8124 100%
Bibliography included	687 8%	1227 15%	2218 27%	2492 31%	1366 17%	74 1%	88 1%	8152 100%
Librarian referral about source	363 4%	601 7%	1144 14%	1610 20%	3460 43%	195 2%	765 9%	8138 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 7A: Asking for Help with Evaluation for Course Work

INDIVIDUAL CONSULTED: Course-Related Research	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Instructors	1566 19%	2468 30%	2531 30%	1042 13%	591 7%	12 --	105 1%	8315 100%
Classmates	656 8%	1958 24%	2855 35%	1653 20%	1031 12%	11 --	123 2%	8287 100%
Friends/Family	353 4%	1121 14%	2270 27%	2422 29%	1941 23%	18 --	176 2%	8301 100%
Librarians	241 3%	639 8%	1571 19%	2360 28%	3073 37%	21 --	396 5%	8301 100%
Writing Center staff*	162 2%	382 5%	1056 13%	1513 18%	3464 42%	23 --	1685 20%	8285 100%
Licensed professionals (e.g., physicians, attorneys, therapists)	120 1%	364 4%	987 12%	1585 19%	3541 43%	35 --	1663 20%	8295 100%

* Use of Writing Center staff was only asked in the question about course-related research. Figures may not add up to 100% due to rounding.

Figure 7B: Asking for Help with Evaluation for Everyday Life Research

INDIVIDUAL CONSULTED Everyday Life Research	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Friends/Family	2408 30%	2487 31%	1918 24%	743 9%	472 6%	22 --	115 1%	8165 100%
Classmates	1105 14%	2329 29%	2574 32%	1229 15%	765 9%	28 --	119 2%	8149 100%
Instructors	449 6%	979 12%	2187 27%	2163 27%	2108 26%	42 1%	171 2%	8099 100%
Licensed professionals (e.g., physicians, attorneys, therapists)	245 3%	703 9%	1910 23%	2008 25%	2767 34%	65 1%	445 5%	8143 100%
Librarians	140 2%	255 3%	731 9%	1719 21%	4893 60%	52 1%	348 4%	8138 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 8: Criteria for Evaluating Library Sources

LIBRARY SOURCE EVALUATION TECHNIQUE: Course Related-Research	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Currency (i.e., content's timeliness)	2552 31%	2964 36%	1769 21%	564 7%	224 3%	31 --	213 3%	8317 100%
Charts (if charts exist, their value)	1892 23%	2792 34%	2116 26%	751 9%	259 3%	58 1%	410 5%	8278 100%
Different viewpoints represented	1450 18%	2677 32%	2690 33%	957 12%	274 3%	42 1%	188 2%	8278 100%
Author gives credits to sources used	1582 19%	2227 27%	2212 27%	1401 17%	623 8%	54 1%	194 2%	8293 100%
Bibliography included	1643 20%	2082 25%	2056 25%	1470 18%	710 9%	85 1%	215 3%	8261 100%
Author's credentials	1265 15%	2090 25%	2327 28%	1733 21%	642 8%	29 --	197 2%	8283 100%
Familiarity of source from previous usage	902 11%	2296 28%	2763 34%	1244 15%	645 8%	87 1%	294 3%	8231 100%
Heard about source Before	620 8%	1716 21%	2659 32%	1796 22%	1062 13%	120 1%	288 4%	8261 100%
Publisher of source	604 7%	1236 15%	1968 24%	2439 29%	1783 22%	47 1%	209 3%	8286 100%
Librarian referral about source	424 5%	1103 13%	1866 23%	1989 24%	1911 23%	161 2%	805 10%	8259 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 10: Student Research Styles and Techniques

RESEARCH TECHNIQUE	Almost Always	Often	Sometimes	Rarely	Never	Don't Know	No Experience with this	Total
Create a thesis statement early on	2075 25%	2766 33%	2416 29%	847 10%	105 1%	33 --	46 1%	8288 100%
Add in own perspective to assignment	1529 18%	3103 37%	2825 34%	649 8%	99 1%	54 1%	36 --	8295 100%
Develop an outline (draft for paper)	1971 24%	2250 27%	2403 29%	1300 16%	311 4%	8 --	20 --	8263 100%
Use system for organizing sources retrieved	1280 16%	2203 27%	2565 31%	1579 19%	542 7%	39 --	44 1%	8252 100%
Figure out search terms early on	832 10%	2191 26%	2662 32%	1764 21%	648 8%	124 2%	61 1%	8282 100%
Develop an overall research plan	801 10%	1894 23%	2522 31%	2127 26%	832 10%	53 1%	37 --	8266 100%
Use same set of resources for different assignments	480 6%	1783 22%	2735 33%	2264 27%	809 10%	96 1%	103 1%	8270 100%
End research after finding number of citations required	593 7%	1590 19%	3298 40%	1995 24%	736 9%	20 --	70 1%	8302 100%
Sit down and write, with no plan at all	621 8%	1449 18%	2514 30%	2731 33%	923 11%	16 --	18 --	8272 100%
Use Interlibrary Loan (ILL) for sources	864 10%	1036 13%	1583 19%	1588 19%	2246 27%	62 1%	898 11%	8277 100%
Spend same amount of time on assignments	287 3%	1524 18%	3524 43%	2274 28%	385 5%	234 3%	21 --	8249 100%
Start over with new topic, after couple of searches w/out results	215 3%	708 9%	2352 28%	3609 44%	1285 16%	28 --	89 1%	8286 100%
Use same topic for different assignments	115 1%	425 5%	1636 20%	3966 48%	1997 24%	54 1%	82 1%	8275 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 11: Use of Productivity Tools Used for Course-Related Research (in the past 6 mos.)

PRODUCTIVITY TOOL	Yes	No	Don't Remember	Never Heard of this before	Total
Highlighting feature on software program	5145 62%	2797 34%	171 2%	149 2%	8262 100%
Citation-making program (e.g., EndNote, EasyBib)	4542 55%	3010 36%	124 2%	571 7%	8247 100%
Document sharing Web application (Google Docs)	3978 48%	3612 44%	143 2%	511 6%	8244 100%
Digital "sticky notes"	2375 29%	4845 58%	146 2%	866 11%	8232 100%
Online forum (e.g., Web discussion boards)	2155 26%	5937 71%	129 2%	59 1%	8280 100%
Photo sharing sites (e.g., Flickr)	2015 24%	6005 73%	117 1%	132 2%	8269 100%
VOIP (voice over Internet protocol such as Skype)	1730 21%	6307 76%	71 1%	140 2%	8248 100%
Wikis (other than Wikipedia)	1507 18%	6031 73%	151 2%	554 7%	8243 100%
Virtual Research Environments (i.e., VREs)	1175 14%	5782 70%	203 3%	1102 13%	8262 100%
Blogging (e.g., LiveJournal)	1140 14%	6922 84%	104 1%	90 1%	8256 100%
Social bookmarking (e.g., digg, delicious)	850 10%	5024 61%	164 2%	2223 27%	8261 100%
Web alerts (e.g., Google Alerts)	802 10%	5789 70%	175 2%	1502 18%	8268 100%
Online time management program (Google Notebook)	755 9%	6229 76%	87 1%	1159 14%	8230 100%
Twitter (e.g., microblogs)	639 8%	7460 90%	69 1%	92 1%	8260 100%

Figures may not add up to 100% due to rounding

Appendix B, Figure 12: Difficulties with Steps during Course-Related Research

DIFFICULTY by Steps: Course-Related Research	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree	Don't Know	No Experience with this	Total
Getting started	3381	3557	652	507	161	10	6	8274
	41%	43%	8%	6%	2%	--	--	100%
Defining a topic	1601	3849	1345	1123	310	16	15	8259
	19%	47%	16%	14%	4%	--	--	100%
Narrowing down a topic	1462	3649	1388	1381	331	12	13	8236
	18%	44%	17%	17%	4%	--	--	100%
Filtering irrelevant results	1494	3520	1362	1272	554	23	21	8246
	18%	43%	17%	15%	7%	--	--	100%
Knowing if "good job" was done	1036	2742	1475	1937	1023	23	14	8250
	13%	33%	18%	24%	12%	--	--	100%
Finding articles in library databases	949	2513	1414	2031	1134	59	161	8261
	12%	30%	17%	25%	14%	1%	2%	100%
Knowing how to cite sources (e.g., MLA)	864	2461	1114	1916	1834	13	14	8216
	11%	30%	14%	23%	22%	--	--	100%
Determining credibility of sources	729	2604	1356	2307	1179	32	46	8253
	9%	32%	16%	28%	14%	--	1%	100%
Reading materials found	625	2613	1642	2069	1263	18	15	8245
	8%	32%	20%	25%	15%	--	--	100%
Writing about what is found	874	2257	1408	2044	1623	13	13	8232
	11%	27%	17%	25%	20%	--	--	100%
Deciding when finished with research	690	2395	1339	2211	1572	26	16	8249
	8%	29%	16%	27%	19%	--	--	100%
Finding up-to-date sources	542	2455	1903	2190	1065	51	31	8237
	7%	30%	23%	27%	13%	1%	--	100%
Knowing if use constitutes plagiarism	747	2162	1291	1976	1978	44	30	8228
	9%	26%	16%	24%	24%	1%	--	100%
Creating search terms	575	2009	1778	2445	1323	65	53	8248
	7%	24%	22%	30%	16%	1%	1%	100%
Finding Web sources	559	1993	1235	2311	2076	38	44	8256
	7%	24%	15%	28%	25%	1%	1%	100%
Integrating information from different sources	374	2051	1511	2711	1535	30	22	8234
	5%	25%	18%	33%	18%	--	--	100%
Knowing when to cite sources (e.g., footnoting)	522	1862	1172	2378	2260	14	13	8221
	6%	23%	14%	29%	28%	--	--	100%
Figuring out where to find sources	481	1873	1862	2046	1392	181	409	8244
	6%	23%	23%	25%	17%	2%	5%	100%
Evaluating sources	236	1920	1878	2897	1211	53	27	8222
	3%	23%	23%	35%	15%	1%	--	100%
Taking notes	333	1387	1607	2575	2255	33	39	8229
	4%	17%	20%	31%	27%	--	1%	100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 13: Difficulties with Steps during Everyday Life Research Process

DIFFICULTY by Steps: Everyday Life Research	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree	Don't Know	No Experience with this	Total
Filtering irrelevant results	798 10%	2491 31%	1603 20%	1666 21%	1333 16%	109 1%	115 1%	8115 100%
Knowing answer is somewhere online, but can't find it	545 7%	2135 26%	1734 21%	1678 21%	1629 20%	230 3%	175 2%	8126 100%
Determining credibility of sources	335 4%	1778 22%	1737 21%	2230 27%	1746 22%	155 2%	143 2%	8124 100%
Evaluating sources	294 4%	1616 20%	1989 25%	2178 27%	1723 21%	156 2%	123 2%	8079 100%
Deciding when finished with research	390 5%	1420 18%	1696 21%	1848 23%	2462 30%	170 2%	140 2%	8126 100%
Finding articles in library databases	378 5%	1220 15%	1551 19%	1553 19%	1645 20%	388 5%	1402 17%	8137 100%
Integrating different sources	216 3%	1268 16%	1840 23%	2375 29%	2117 26%	155 2%	146 2%	8117 100%
Defining topic— information needed	253 3%	1291 16%	1291 16%	2163 27%	2893 36%	130 2%	116 1%	8137 100%
Finding up-to-date sources	221 3%	1303 16%	1790 22%	2373 29%	2153 27%	145 2%	134 2%	8119 100%
Reading materials found	240 3%	1262 16%	1577 19%	2337 29%	2490 31%	101 1%	107 1%	8114 100%
Figuring out where to find sources	241 3%	1250 15%	1532 19%	2477 31%	2383 29%	125 2%	114 1%	8122 100%
Creating search terms	230 3%	1149 14%	1435 18%	2205 27%	2845 35%	128 2%	135 2%	8127 100%
Narrowing down a topic	255 3%	1011 12%	1369 17%	2080 26%	3132 39%	153 2%	139 2%	8139 100%
Getting started	292 4%	918 11%	1185 15%	1898 23%	3630 45%	113 1%	115 1%	8151 100%
Finding Web sources	172 2%	747 9%	1239 15%	2052 25%	3653 45%	131 2%	131 2%	8125 100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 15A: Difficulties with Stages during Course-Related Research Process

DIFFICULTY by Stage: Course-Related Research	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree	TOTAL
Task Definition	2803	2813	1926	442	175	8159
	34%	35%	24%	5%	2%	100%
Self Assessment	1018	2336	1385	2065	1369	8173
	12%	29%	17%	25%	17%	100%
Search	530	1625	2323	1910	842	7230
	7%	23%	32%	26%	12%	100%
Using Information	321	1578	2785	2127	853	7664
	4%	21%	36%	28%	11%	100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 15B: Difficulties with Stages during Everyday Life Research Process

DIFFICULTY by Stage: Everyday Life Research	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree	TOTAL
Using Information	321	1295	2406	1880	1573	7475
	4%	17%	32%	25%	21%	100%
Self Assessment	247	961	1286	1940	1858	6292
	4%	15%	20%	31%	30%	100%
Search	203	719	1616	1850	1723	6111
	3%	12%	26%	30%	28%	100%
Task Definition	302	745	1585	1668	3464	7764
	4%	10%	20%	21%	45%	100%

Figures may not add up to 100% due to rounding.

Appendix B, Figure 16: What Is Important to Students when Conducting Course-Related Research?

Factor of Possible Importance	Very Important	Important	Moderately Important	Of Little Importance	Not Important	Don't Know	No Experience with this	Total
Passing the course	7195 87%	887 11%	119 1%	36 --	15 --	5 --	18 --	8275 100%
Finishing the paper/assignment	6597 80%	1397 17%	210 3%	25 --	9 --	7 --	7 --	8252 100%
Getting a good grade	6263 76%	1713 21%	268 3%	27 --	10 --	5 --	6 --	8292 100%
Meeting number of citations required	4923 60%	2336 28%	791 10%	113 1%	27 --	7 --	60 1%	8257 100%
Meeting required page length of papers	4845 58%	2402 29%	848 10%	132 2%	20 --	6 --	10 --	8263 100%
Conducting comprehensive research about topic	2845 34%	3622 44%	1550 19%	176 2%	31 --	25 --	16 --	8265 100%
Learning something new	3362 41%	3034 37%	1497 18%	272 3%	69 1%	7 --	7 --	8248 100%
Proving I've done the research and found answer(s)	3112 37%	3255 39%	1310 16%	369 5%	74 1%	105 1%	46 1%	8271 100%
Improving analytical skills	3004 36%	2738 33%	1757 21%	602 7%	109 1%	24 --	11 --	8245 100%
Integrating my perspective into paper/assignment	2473 30%	2920 35%	2065 25%	652 8%	103 1%	45 1%	13 --	8271 100%
Improving writing skills	2676 32%	2667 32%	1999 24%	780 9%	134 2%	14 --	8 --	8278 100%
Improving research skills	2638 32%	2614 31%	2033 24%	824 10%	134 2%	14 --	9 --	8266 100%
Impressing instructor with intellectual abilities	2058 25%	2611 31%	2242 27%	1046 13%	258 3%	23 --	10 --	8248 100%
Having chance to be creative with assignment	2135 26%	2401 29%	2147 26%	1171 14%	365 4%	29 --	14 --	8262 100%
Impressing parents with grade received	1676 20%	1565 19%	1812 22%	1813 22%	1295 16%	23 --	82 1%	8266 100%

Figures may not add up to 100% due to rounding

Appendix C: Survey Instrument

Question 1.

What is the name of the institution where you are enrolled?

• Boise State University
• Colgate University
• College of William & Mary
• Colorado State University
• Corban College
• CSU Maritime
• Eastern Michigan University
• Felician College
• Gettysburg College
• Holy Names University
• Linfield College
• New Mexico State University
• Northern Kentucky University
• Northern Michigan University
• Ohio State University
• Purdue University
• St. Mary's College of Maryland
• Southern Nazarene University
• State College of Manatee-Sarasota
• Temple University
• University of Arizona
• University of Michigan
• University of Minnesota
• West Virginia University
• Winston-Salem University

Question 2.

Your current status as a student is:

• Freshman *(skip to end of survey for contest entry, since freshmen are excluded from study population)*
• Sophomore
• Junior
• Senior
• Does not apply to me
 No response

Question 3.

Which one of the following disciplines does your major area of study fall under?
(Click ONLY ONE.)

• Architecture
• Art (includes Ceramics, Dance, Digital Arts, Drama, Industrial Design, Music, Photography, Sculpture, Art History)
• Business Administration (includes Finance, Accounting, Management)
• Computer Science
• Education
• Occupational training (includes Paralegal, Radiology Technician, Electrician, Recreation Programs)
• Engineering (includes Aeronautical, Civil, Chemical, Electrical, Mechanical)
• Humanities (includes English, Languages, History, Geography, Literature, Communication, Philosophy, Religion)
• Social Sciences (includes Anthropology, Economics, Political Science, Psychology, Sociology)
• Sciences (includes Astronomy, Plant, Biology, Chemistry, Physics)
• Mathematics (includes Statistics)
• Nursing
• Still undecided about my major area of study
• Other:

Question 4. Part One: Course-Related Research Assignments

In this part of the questionnaire, we want to learn about how you work on research assignments in humanities and/or social science courses you may have taken on this campus. First, what kinds of assignments have you had?

Over the last year, which of the following types of research assignments have you had for the social science and/or humanities courses you have taken?
(Click ALL that apply.)

• Papers that present an argument about an issue(s)
• Papers that present a historical analysis of an event(s)
• Papers that present a "close reading" or interpretation of a text
• Papers that present a case study analysis
• Papers that present a literature review
• Papers that present a proposed study
• Oral presentation
• Oral presentation and an accompanying paper
• Multimedia product that requires research (i.e., Web site, video)
• I have no experience writing course-related research papers on this campus
• Other:

Question 5. Some students use certain resources, but not others, when they are working on research assignments for humanities and social science courses. We want to find out which resources YOU use.

HOW OFTEN do you CONSULT THESE RESOURCES during your course-related research process? (If you do not consult these resources at all, let us know, too.)

Course readings
Blogs
Search engines (e.g., Google, Bing, Yahoo!, Ask.com)
Wikipedia
Governmental Web sites (.gov sites)
Research databases through the library Web site (e.g., EBSCO, JSTOR, ProQuest)
Librarians
Library shelves
Instructors
Encyclopedias (e.g., Britannica, either online or print)
Classmates
Friends/family
My personal collection (materials I already own or buy)
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know

Question 6. Evaluating What You Have Found

When you find a source through the LIBRARY (books or articles from library Web databases), DO YOU CONSIDER the following things?

Consider how current the library source is.
Consider an author's credentials (e.g., where he/she is faculty or works).
Consider whether the content acknowledges different viewpoints (i.e., not biased).
Consider whether the author gives credit for using someone else's ideas (e.g., footnotes).
Consider whether the library source has a bibliography.
If there are charts, consider whether they have vital information (i.e., not just attractive graphics).
Consider who the publisher of the library source is.
Consider whether a librarian mentioned using the library source.
Consider whether I have ever heard of the library source before.
Consider whether I have used the library source before.
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 7. Now let's focus on sources that you find out on the WORLD WIDE WEB.

Let's say you find a source "out on the WEB" (e.g., .com or .gov sites), DO YOU CONSIDER the following things?

Consider how current the Web site is.
Consider a Web site author's credentials (e.g., where he/she is faculty or works).
Consider whether the Web site content acknowledges different viewpoints (i.e., not biased).
Consider whether the Web site gives credit for using someone else's ideas (e.g., footnotes).
Consider what the URL (i.e., Web site address) is and what it may mean.
Consider whether the Web site has links to other resources on the Web.
Consider whether the Web site has bibliography.
If there are charts, consider whether vital information is added (i.e., not just attractive graphics).
Consider whether a librarian mentioned using the Web site.
Consider whether I have ever heard of the Web site before.
Consider whether I have used the Web site before.
Consider whether the Web site's design tells me it's a legitimate site.
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 8. Some students ask people for help with evaluating different kinds of sources (i.e., Web and library sources), while other students do not.

Do you ask any of the following PEOPLE for ASSISTANCE with evaluating COURSE-RELATED sources? (If you don't ask any of the following people for help, we want to know this, too.)

Instructors
Librarians
Classmates
Friends and family
Writing Center staff
Licensed professionals (i.e., physicians, attorneys, therapists)
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 9. What's YOUR "Research Style"? Students have different practices, routines, techniques, and workarounds for completing course-related research assignments. Below are statements different students have made about how they approach assignments.

How OFTEN do you use each of these research PRACTICES during YOUR OWN course-related research process?

Once I find the number of citations the instructor expects, I end my research process.

If I don't find something in one or two searches, I start over with a brand new topic.

I work my own perspective into the assignment, so the instructor knows what I think.

I come up with a thesis statement early on.

I develop an outline for how to proceed with the assignment (e.g., writing the paper).

If the assignment is a paper, I sit down and just start writing, without much of a plan for what

I'm going to say at all.

One of the first things I do is to figure out search terms to use.

I develop an overall research plan to guide my research process.

I use a system for organizing the research sources I find along the way.

I use interlibrary loan or document delivery services if my library doesn't have what I need there.

I tend to use the same set of research resources from one assignment to the next.

I tend to write about the same topic from one assignment to the next.

I tend to spend the same amount of time on assignments.
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 10. There are a lot of different productivity tools, some online, others that are not, which students can use for supporting various tasks during their own course-related research process.

Have YOU used any of these PRODUCTIVITY TOOLS for course-related research tasks in the LAST SIX MONTHS?

Highlighting feature for underlining text on a computer screen

Digital "sticky notes" for use with a computer (e.g., Post-It digital notes)

Citation-making programs (e.g., RefWorks, EndNote, EasyBib)

Social bookmarking (e.g., digg, delicious)

Alerting services (e.g., programs that send out automatic Web feeds for newly appearing content)

Microblogs (i.e., Twitter)

Document sharing programs (e.g., Google Documents)

Online time management programs with sharing (e.g., Google Notebook)

Wikis for creating and sharing Web content (other than Wikipedia)

Photo-sharing sites (e.g., Flickr, Photobucket)

Virtual research environments

Blogging (e.g., LiveJournal)

Voice over Internet Protocol (e.g., Skype)

An online forum where I can post a question and get an answer from someone

- Yes
- No
- Don't Remember
- Never Heard of this Before

Question 11. HOW IMPORTANT are each of the following to you when you are working on a course-related research paper?

Getting a good grade from the instructor.

Passing the course.

Getting the paper finished.

Meeting the paper-length requirement (if there is one).

Meeting the number of citations required (if there it exists).

Doing a comprehensive investigation about my research topic.

Finding answers I can insert into the paper to prove I've done research.

Improving my writing skills.

Improving my research skills.

Improving my analytical skills.

Integrating my own perspective into the paper.

Learning something new.

Impressing the instructor with my intellectual abilities.

Impressing my parents with the grade I end up receiving.

Having the chance to be creative with an assignment.

- Very important
- Important
- Moderately Important
- Of Little Importance
- Not Important
- Don't Know
- No Experience with this Situation

Question 12. Overall, when you think about the ENTIRE research process--from the moment you get the assignment until you turn in your research paper--what is DIFFICULT for you?

How strongly do you AGREE OR DISAGREE with each of the following statements about what is DIFFICULT about the course-related research?

Getting started on the assignment is difficult.

Defining a topic for the assignment is difficult.

Narrowing down a topic is difficult.

Coming up with search terms is difficult.

Finding articles in the research databases on the library's Web site is difficult (e.g., EBSCO, JSTOR, ProQuest).

Finding sources to use "out on the Web" is difficult (e.g., Google, Wikipedia, government sites).

Determining whether a Web Site is credible or not is difficult.

Figuring out where to find sources in different parts of the campus is difficult.

Finding up-to-date materials is difficult.

Having to sort through all the irrelevant results I get to find what I need is difficult.

Evaluating the sources I've found is difficult.

Reading through the material is difficult.

Taking notes is difficult.

Integrating different sources from my research into my assignment is difficult.

The writing part is difficult.

Knowing when I should cite a source is difficult.

Knowing how to cite a source in the right format is difficult.

Knowing whether my use of a source, in certain circumstances, constitutes plagiarism or not is difficult.

Deciding whether "I'm done" or not is difficult.

Knowing whether I've done a good job on the assignment or not is difficult.

- Strongly Agree
- Somewhat Agree
- Neither Agree or Disagree
- Somewhat Disagree
- Strongly Disagree
- Don't Know
- No Experience with this Situation

Question 13. Part Two: Conducting "Everyday Life Research"

Now, we'd like to ask you about something entirely different. We'd like to know a little about your experiences with conducting what might be called "everyday life research." Everyday life research consists of collecting materials for solving information problems that may occur during the course of your daily life.

Over the last six months have you carried out EVERYDAY LIFE RESEARCH about one of these topics? (Click ALL that apply.)

Health/wellness issue (either for yourself or someone close to you)
News/current events
Purchasing something (e.g., product or service)
Something related to what I am asked to do at my job
Domestic life (e.g., figuring out where to live)
Work/career (e.g., salaries for certain types of professions, job openings).
Spiritual information (e.g., finding out about different religious beliefs)
Travel information (e.g., trip-planning)
Advocacy information (e.g., finding out about different political/social causes)
Social contacts (e.g., using a social networking site to find others with similar interests)
Searched for an expert of some kind (e.g., medical doctor)
Other:

Question 14. Some people use certain resources, but not others, to find everyday life information. What do you use?

HOW OFTEN do you CONSULT THESE RESOURCES during your EVERYDAY LIFE research process? (If you do not consult these resources at all, let us know, too.)

Blogs
Search engines (Google, Bing, Yahoo!, Ask.com)
Wikipedia (either from a Google result or direct visit to Wikipedia Site)
Governmental Web sites (.gov sites)
Research databases on library Web site (e.g., EBSCO, JSTOR, ProQuest)
Librarians
Library shelves
Instructors
Encyclopedias (Britannica, either online or print)
Classmates
Friends/family
Social networking site (e.g., Facebook)
My own personal collection (e.g., materials I already own or buy)
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know

Question 15. Evaluating What You Have Found for Everyday Life Research

When you have found a source for EVERYDAY LIFE research on the Web, DO YOU CONSIDER the following things?

Consider how current the Web site is.
Consider a Web site author's credentials (e.g., where he/she is faculty or works).
Consider whether the Web site acknowledges different viewpoints (i.e., not biased).
Consider whether the Web site author gives credit for using someone else's ideas (e.g.,
footnotes).
What the URL (i.e., Web site address) is and what it may mean.
Whether the Web site has links to other resources on the Web.
Whether the Web site has bibliography.
If there are charts, consider whether vital information is added (i.e., not just attractive graphics).
Consider whether a librarian mentioned using the Web site.
Consider whether I have ever heard of the Web site before now.
Consider whether I have used the Web site before.
Consider whether the Web site's design tells me it's a legitimate site.
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 16. Do you ask any of the following PEOPLE for ASSISTANCE when you are evaluating sources for EVERYDAY LIFE research? (If you don't ask any of the following people for help, we'd like to know this, too.)

Friends and family
Classmates
Librarians
Instructors
Licensed professionals (i.e., physicians, attorneys, therapists)
- Almost Always
- Often
- Sometimes
- Rarely
- Never
- Don't Know
- No Experience with this Situation

Question 17. Now, let's talk about difficulties with the ENTIRE EVERYDAY LIFE research process. What is DIFFICULT for you?

How much do you agree or disagree with each of the statements about what's difficult about EVERYDAY LIFE research?

Getting started on everyday life research is difficult.

Defining what I need during everyday life research is difficult.

Narrowing down a topic for everyday life research is difficult.

Coming up with search terms for everyday life research is difficult.

Finding articles for everyday life research in the research databases on the library's Web site is difficult (e.g., EBSCO, JSTOR, ProQuest).

Finding sources to use "out on the Web" for everyday life research is difficult (e.g., Wikipedia, Google, .gov sites)

Determining whether a source for everyday life research I find is credible or not is difficult (online or print).

Finding up-to-date materials for everyday life research is difficult (i.e., online or print)

Having to sort through all the irrelevant results I get to find what I need for everyday life research is difficult.

Evaluating the resources I find and may end up using for everyday life research is difficult.

Figuring out where to find sources for everyday life research is difficult.

Reading through material is difficult.

Knowing the "answer" for everyday life research is online, but not being able to find it is difficult.

Integrating information from different sources is difficult.

Deciding whether "I'm done" or not with my everyday life research is difficult.

- Strongly Agree
- Somewhat Agree
- Neither Agree or Disagree
- Somewhat Disagree
- Strongly Disagree
- Don't Know
- No Experience with this Situation

Question 18. Tell Us a Little More About Yourself

Now just a few questions to find out a little more about you. . .

What is your GPA?

- Below 1.4
- 1.4 - 1.6
- 1.7 - 2.0
- 2.1 - 2.3
- 2.4 - 2.6
- 2.7 - 3.0
- 3.1 - 3.3
- 3.4 - 3.7
- 3.8 - 4.0
- Declined to State

Question 19.

What is your age?

- 18-20 years old
- 21-22 years old
- 23-25 years old
- Over 25 years old
- Declined to State

Question 20.

What is your gender?

- Male
- Female
- Declined to State

Question 21.

If you would be willing to participate in a follow-up interview (15 - 30 mins.) to tell us about your experiences conducting research, please provide us with a telephone number and your first name (only) for contacting you.

[END]

Acknowledgements