

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.

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.

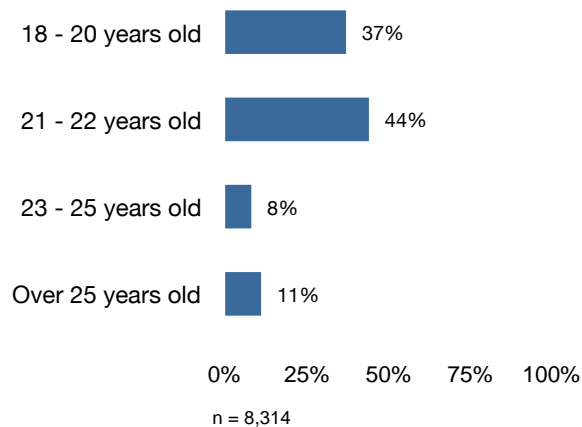
Description of the Student Sample

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



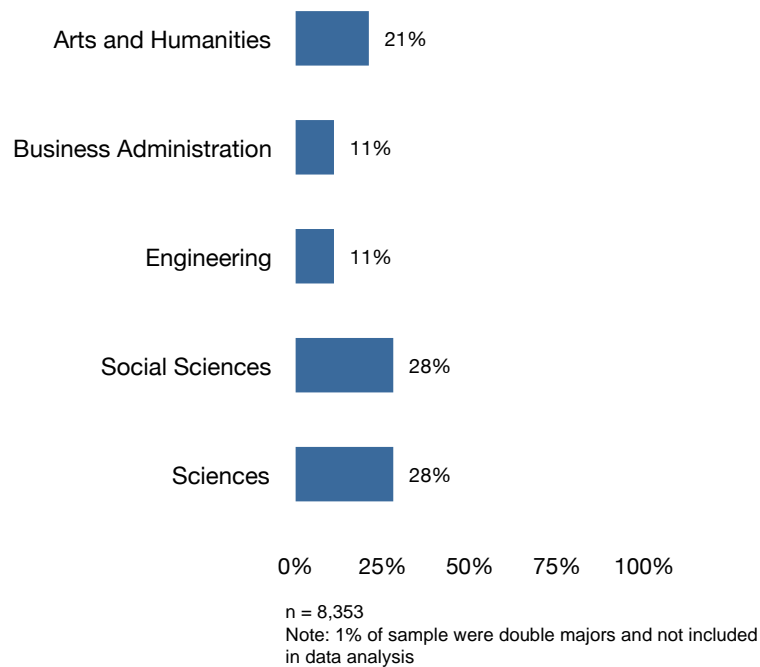
⁵² For example, Ohio State University (OSU) has an enrollment of 41,000 students. PIL sent out survey invitations to a sub-sample of 7,500 randomly selected students, which was provided by OSU's Registrar's Office.

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

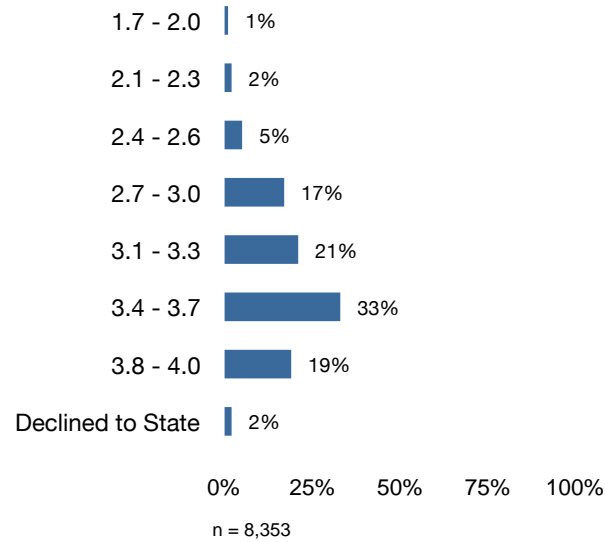


We also collected data about students' grade point average (GPA). The most frequently reported (i.e., the mode) GPA for the sample was the category for 3.4 and 3.7. As a point of reference, we calculated this grade point average as being between a B+ and an A-.⁵³

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

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/genclat/front/Grading_Sys.html, accessed online on August 10, 2009.

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



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).

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?

⁵⁵ Sarah Wachter, a graduate student in the University of Washington Information School, conducted the telephone interviews during August and September 2010 and we are grateful to her time and excellent efforts.

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?