

LEARNING CURVE:

How College Graduates Solve Information Problems Once They Join the Workplace



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PROJECT INFORMATION LITERACY RESEARCH REPORT

THE PASSAGE STUDIES

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Abstract: Qualitative findings about the information-seeking behavior of today's college graduates as they transition from the campus to the workplace. Included are findings from interviews with 23 US employers and focus groups with 33 recent graduates from four US colleges and universities, conducted as an exploratory study for Project Information Literacy's (PIL's) Passage Studies. Most graduates in our focus groups said they found it difficult to solve information problems in the workplace, where unlike college, a sense of urgency pervaded and where personal contacts often reaped more useful results than online searches. Graduates said they leveraged essential information competencies from college for extracting content and also developed adaptive information-seeking strategies for reaching out to trusted colleagues in order to compensate for what they lacked. At the same time, employers said they recruited graduates, in part, for their online searching skills but still expected and needed more traditional research competencies, such as thumbing through bound reports, picking up the telephone, and interpreting research results with team members. They found that their college hires rarely demonstrated these competencies. Overall, our findings suggest there is a distinct difference between today's graduates who demonstrated how quickly they found answers online and seasoned employers who needed college hires to use a combination of online and traditional methods to conduct comprehensive research.

Introduction

It is the day after graduation and even though most former college students have turned in their last assignment, packed up their possessions, and are leaving the academy behind, their research days are far from over. Only the subject matter has changed. Many graduates will quickly find themselves avid information seekers as they look for work, learn the ropes of a career, build new communities, tend to personal and professional business, and continue the journey of their lives.

In a world where technology abounds, social networks buzz, and connectivity is as commonplace as electricity, graduates may post their resume on Monster, apply for a few coveted internships they have found on Vault, and hook up with some new housemates on Craigslist. As dating options diminish after college, they may find themselves browsing profiles on Okcupid.com.

But once they settle into a new job, many of today's graduates soon discover that the techniques that may have worked so well for finding information when they were in college are no longer enough. Other factors also figure into the equation for job success, such as teamwork and the ability to ferret out information beyond what they find on their computer screens. This transition is one of the greatest challenges new graduates face in the digital age.

Project Information Literacy (PIL) is a national research study.¹ This report is the first in a new research initiative at PIL called the "The Passage Studies."² The purpose of this unique body of ongoing research is to investigate the information transitions young adults go through at critical junctures in their lives.

We seek to understand the challenges today's college students face and the information competencies and strategies they adopt and develop as they move from one complex information landscape to another. At the same time, we ask what insights can be gleaned from studying these young adults, in the hope that it will lead to improvements in teaching, training, and preparing them for life in the digital age.

In this study, we ask what happens to the information-seeking behavior of today's college students once they graduate and enter the workplace. We explored this question from two perspectives: from that of the employers who hire graduates, and from the experiences of graduates themselves who join the workplace.

During the winter and spring of 2012, we conducted 23 in-depth interviews with employers about their expectations and evaluations of newly graduated hires and their ability to solve information problems in the workplace. We also moderated five focus group sessions with 33 recent graduates about the challenges they encounter and the information-seeking practices they use as they make the transition from college to the workplace.³

¹ Project Information Literacy (PIL) is a public benefit nonprofit dedicated to conducting ongoing research about young adults and their research habits in the digital age. Alison J. Head, Ph.D. directs PIL. She is also a Fellow at Harvard University's Berkman Center for Internet and Society <<http://cyber.law.harvard.edu/>> and the Harvard Library Innovation Lab <<http://librarylab.law.harvard.edu/>>. Communication about this research report should be sent to Dr. Alison J. Head at alison@projectinfolit.org.

² This PIL study was conducted in collaboration with the Harvard's Berkman Center for Internet and Society and was generously supported with a federal planning grant (LG-52-11-0269-11) from the Institute of Museum of Library Services (IMLS), creating strong libraries and museums that connect people to information and ideas.

³ We are grateful for support from the PIL Research Team who conducted interviews for this study: Elizabeth L. Black (Ohio State University), Jordan Eschler (University of Washington), Sean Fullerton (University of Washington), Sue Gilroy (Harvard University), and Michele Van Hoeck (California Maritime Academy).

Major Findings

The information transition from college to the workplace is daunting, according to the graduates we interviewed. Many said they felt as if they had been dropped into an unfamiliar setting that radiated urgency and pulsed with unrelenting deadlines. They were challenged by vaguely defined workplace research tasks and little feedback.

As they settled into their 40-plus hour-a-week jobs, graduates said they relied on their computer expertise and leveraged information competencies from their college days for solving information problems. Unfortunately, these competencies only went so far. Employers needed them to use a more comprehensive and varied research approach.

All in all, our findings reveal two sides of the same coin. The basic online search skills new college graduates bring with them are attractive enough to help them get hired. Yet, employers found that once on the job, these educated young workers seemed tethered to their computers. They failed to incorporate more fundamental, low-tech research methods that are as essential as ever in the contemporary workplace.

Most college hires were prone to deliver the quickest answer they could find using a search engine...

The major findings from our interviews and focus groups are as follows:

1. When it was hiring time, the employers in our sample said they sought similar information proficiencies from the college graduates they recruited. They placed a high premium on graduates' abilities for searching online, finding information with tools other than search engines, and identifying the best solution from all the information they had gathered.
2. Once they joined the workplace, many college hires demonstrated computer know-how that exceeded both the expectations and abilities of many of their employers. Yet we found these proficiencies also obscured the research techniques needed for solving information problems, according to our employer interviews.
3. Most college hires were prone to deliver the quickest answer they could find using a search engine, entering a few keywords, and scanning the first couple of pages of results, employers said, even though they needed newcomers to apply patience and persistence when solving information problems in the workplace.
4. A majority of employers said they were surprised that new hires rarely used any of the more traditional forms of research, such as picking up the phone or thumbing through an annual report for informational nuggets. Instead, they found many college hires—though not all—relied heavily on they found online and many rarely looked beyond their screens.
5. At the same time, graduates in our focus groups said they leveraged essential information competencies from college to help them gain an edge and save time at work when solving workplace information problems. Many of them applied techniques for evaluating the quality of content, close reading of texts, and synthesizing large quantities of content, usually found online.
6. To compensate for the gaps in their skills sets, graduates said they developed adaptive strategies for solving information problems in the workplace, often on a trial-and-error basis. Most of these strategies involved cultivating relationships with a trusted co-worker who could help them find quick answers, save time, and learn work processes

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

Part One: Employers' Expectations. We present findings from our interviews with employers about their expectations, needs, and assessment of college hires' ability to solve for information problems.

Part Two: Graduates' Experiences. We feature findings from our focus group sessions with recent graduates in which they discussed the challenges they faced and the information practices they used as they transitioned from classroom to the office.

The findings from this exploratory study are intended to give us insights into the ways that college graduates solve information problems once they leave campus and join the workplace. Given the limited size of our sample and our qualitative research methodology, these findings should not be viewed as comprehensive, but rather as exploratory and as another part of ongoing research. Our plan is to more rigorously test these qualitative findings in a future study using a large-scale survey and quantitative methods. ❖

Approach

Our ongoing study is grounded in research on information-seeking behavior. As information scientists, we study the ways in which college students conceptualize and operationalize information seeking and use specific processes. We investigate these processes through participants' accounts, reports, and experiences.

Three sets of questions framed this study:

1. What expectations do employers have for today's college graduates for finding and using information in the workplace? How prepared are college hires to solve information problems? What information competencies do employers need and expect from college hires?
2. What challenges relating to information use and solving information problems do recent college graduates face in the workplace?⁴ Which information competencies from college learning experiences are particularly applicable? What adaptive strategies do graduates use when they have to solve information problems?
3. What are the gaps between the information competencies employers require of college hires and the skill sets these newcomers possess?

We used employer interviews and focus groups with recent graduates to gather qualitative data.⁵ Both methods allow for asking open-ended questions so that the discussions can freely explore new areas of research and examine complex questions.⁶ Data were collected using telephone interviews with employers between January 25 and May 22, 2012. Figure 1 lists the organizations in our interview sample.⁷

⁴ We defined *recent graduates* as those who had graduated between 2005 and 2011 and were not enrolled in any kind of graduate program at the time of the interviews. See the Appendix for more details about the study's research methods. In addition, see pages 37 – 38 of this report for a discussion of interviews and limitations as a research method and what we did to compensate for these issues in our study design.

⁵ None of the participants in our focus group sessions were employed at any of the organizations where employer interviews were conducted.

⁶ For a complete discussion of the methods used for this study, see the Appendix, 29 - 37.

Figure 1: Organizations in the Employer Interview Sample

Organization	Location	Type of Industry
Battelle Memorial Institute	Columbus, OH	Engineering
BlueKai	Bellevue, WA	Technology (consumer products)
Brookings Institution	Washington, D.C.	Policy/research
Capital Fellows Program	Sacramento, CA	Government/educational
Credo Reference	Boston, MA	Technology (library sector)
Discovery Communications	New York, NY	News/media
FBI	Washington, D.C.	Government
Fluke Manufacturing	Everett, WA	Manufacturing
Fred Hutchinson Cancer Research Center	Seattle, WA	Healthcare/research
KPMG	Seattle, WA	Financial services
Marriott International, Inc.	Bethesda, MD	Hospitality (lodging)
The Media Consortium	Washington, D.C.	News/media (nonprofit)
Microsoft	Redmond, WA	Technology (consumer products)
Mother Jones	San Francisco	Media/news
Nationwide Insurance	Columbus, OH	Financial services
OCLC	Dublin, OH	Technology (library sector)
Pariveda Solutions	Dallas, TX	Management Consulting
Port of Los Angeles	San Pedro, CA	Transportation
The Press Democrat	Santa Rosa, CA	News/media
Price Pump	Sonoma, CA	Manufacturing
Serial Solutions	Seattle, WA	Technology (library sector)
Smithsonian	Washington, D.C.	Government (museums)
SS & G Financial Services, Inc.	Cleveland, OH	Financial services

n = 23 employer interviews

We defined *employer stakeholders* as managers, directors, and/or project leads who hire, train, supervise, and/or evaluate recent college graduates in entry-level positions and/or in paying internships. We obtained our interview sample by sending a recruitment email to potential participants requesting voluntary participation in a federally funded study about recent college hires.

⁷ For more details about the organizations and how the employer interviewees were selected see this report's Appendix, 33 - 35. We modified industry categories from the U.S. census as our basis for determining industry classifications in Figure 1.

A PIL interviewer asked three open-ended questions in audio recorded sessions about (1) employers' expectations of college hires as information seekers and users, (2) employers' assessments of the strengths of college hires for solving information problems in the workplace, and (3) employers' assessments of the weaknesses college hires demonstrated. As part of the interviews, we collected demographic information about each participant.⁸

Once the sessions concluded, PIL interviewers used a latent coding methodology for analytic reduction and interpreting underlying patterns in the data. Our coding guide was based on references to the Association of College and Research Libraries' (ACRL) information literacy standards and *Habits of Mind*, 16 formalized thinking characteristics of critical thinkers.⁹

Focus Groups with College Graduates

In our study, we conducted five focus group sessions with a voluntary total sample of 33 recent graduates from four colleges and universities in the US between April 21 and May 19, 2012.¹⁰ Figure 2 shows details about the institutions in the focus group sample.

Figure 2: Institutions in the Focus Groups Sample

Institution	Session Date	Type of Institution
Harvard College	May 19, 2012	Private four-year college
Santa Rosa Junior College	April 21, 2012	Community college
University of Puget Sound	May 5, 2012	Private, four-year liberal arts college
University of Texas at Austin	April 28, 2012	Public, four-year university

n = 33 graduate participants

We define *recent graduates* as college students who had graduated with a BA or BS between 2005 and 2011. We obtained a random sample of graduates by collaborating closely with the library and foundation office at each institution in our sample.

We sent a recruitment email to a random sample of recent alumni requesting voluntary participation in a federally funded study about finding and using information in the workplace. To determine eligibility, we collected data about each potential participant in an online survey in advance. Then, at the time we scheduled an interview, we emailed documentation explaining study details and procedures (i.e.,

⁸ On the average, the interviews lasted 45 minutes on a weekday. Each interview was held at the employee's workplace at a time that had been pre-arranged by the PIL interviewer in a follow-up email that provided details and procedures of the study (e.g. assurances of confidentiality). The interviews were audio recorded to ensure accuracy of the data we collected.

⁹ The ACRL standards for information literacy competencies in higher education are available at <http://www.ala.org/acrl/standards/informationliteracycompetency> (accessed June 1, 2012). Art Costa's collection of 16 thinking dispositions exhibited by critical thinkers is available at <http://tinyurl.com/7hnpo77> (accessed June 1, 2012).

¹⁰ Alison Head moderated focus groups with graduates from Harvard College, Santa Rosa Junior College and the University of Puget Sound and PIL Research Team Member Jordan Eschler moderated a session with graduates from the University of Texas at Austin.

assurances of privacy). Afterwards, a PIL moderator led an audio-recorded discussion about three topics: (1) types of information problems they encountered, (2) differences in solving information problems in the workplace as opposed to college, and (3) competencies and strategies used for solving information problems.¹¹

Solving Information Problems

For the purposes of this study, the *process of research* consists of four activities: identifying a topic, searching for information about it, evaluating the information, and then applying it.¹² We asked participants—employers and recent graduates—to describe their research process and the sources used for finding information, which included the Web, proprietary databases, company documents, books, newspapers, libraries, and/or personal contacts.

We also made a distinction between *competencies* and *strategies*. We define *competencies* as the skills and knowledge needed to solve an information problem. This means that someone both understands what action needs to be taken to execute the task and also how to perform that action. In contrast, *strategies* are deliberate plans, often highly individualized, that use these competencies to achieve an objective, depending on the problem and other constraints.

Operationalizing the concept of information literacy to a sample of employers has itself been especially problematic in prior research studies.¹³ Therefore, we asked employers to discuss the process of *solving information problems* in the workplace, rather than asking them to list their standards and criteria for information literacy.¹⁴

We found that using this phrase resonated with employers, perhaps for two reasons. Nearly all of the organizations in our employer sample are “information industries,” they were primarily involved in the creation, production, or dissemination of information.

Moreover, *information work* has become an identifiable and fundamental component of most jobs, no matter where someone is on the organizational chart. This phenomenon has proliferated with the use of Smart Phones, cloud computing, and social media. ❖

¹¹ The sessions were held on Saturdays to accommodate participants’ work schedules. The sessions lasted an average of 75 minutes, including debriefing and follow-up discussions. Before the session began, all of the participants were given a \$10 Amazon gift card as a thank you for their time. Sessions were held on the “home campus” of the graduates in all cases, except for the University of Puget Sound sessions, which were held at the University of Washington, since more graduates lived in the Seattle area than in the rural Puget Sound community.

¹² We acknowledge that these parts of the research process were not necessarily sequential. Research is often an organic process where results are initially found and then a search is revised as information is being applied.

¹³ For an in-depth discussion and theory, see Annemarie Lloyd, *Information Literacy Landscapes: Information Literacy in Education, Workplace, and Everyday Contexts* (Oxford: Chandos Publishing, 2010).

¹⁴ The Big6 Model defines information literacy within the context of defining and solving information problems. See Michael B. Eisenberg and Robert E. Berkowitz, *Information Problem-Solving: The Big6™ Skills Approach to Library and Information Skills Instruction* (Norwood, NJ: Ablex, 1990).

Results

Part One: Employer Expectations

The candidate gave me an array of places where she would look for information, so she got the internship. In the other interviews, there were many graduates who just looked in one place—the Internet—and that was the problem. You want one of these college grads to say, ‘I’d look at city records,’ or ‘Oh, my God, I can go to the library, or the Internet, or look on LinkedIn to get what you need.’ It’s a whole bag of tricks when it comes to the skills you need for doing research today.

What makes today’s college graduates hireable? Employers have traditionally relied on the same criteria to guide their recruiting decisions: the ability to communicate, work in teams, make decisions, and plan.¹⁵

By 2011, these criteria had changed. For the first time, the biennial NACE Job Outlook Survey asked about the importance of *obtaining and processing information*. This new category ranked fourth in a list of ten skills. Respondents rated it “very important.”¹⁶

These survey results may signal a trend toward employers placing a higher premium on information competencies. Yet the results go only so far in describing what information competencies are important in the workplace and why.¹⁷ (See Figure 3.)

When we interviewed 23 employers for our study, we asked a series of questions to explore these otherwise limited descriptions of information competencies. When employers sought “good hires,” for example, what information competencies did they need and expect? How prepared are today’s college hires to solve information problems at work, according to employers?

We found certain commonalities in how employers discussed their expectations of college hires as information seekers and users—whether these newcomers worked as researchers, market analysts, programmers, engineers, writers, or Web designers.

The similarities surfaced first in the adjectives employers used to describe their hiring intentions. They frequently said they were looking to hire applicants who were *agile, collaborative, flexible, nimble, patient, persistent, and resourceful*.

In terms of information competencies, nearly all of the employers we interviewed said they expected candidates to have *the ability to search online*. We soon learned to recognize this as a catch phrase that could mean any number of things. For most employers, however, the phrase signified *knowing how and where to search on the Web*.

For some employers it also meant knowing how to use in-house databases made in Excel and/or Access and search two or three proprietary databases, such as Lexis-Nexis and/or THOMAS. Employers assumed that graduates had acquired these competencies in college.

¹⁵ National Association of Colleges and Employers (NACE) Research, *Job Outlook 2011* NACE Research Biannual Survey (NACE, Nov. 2011), <http://www.unco.edu/careers/family/pdf/NACEJobOutlookNov2011.pdf> (accessed June 26, 2012).

¹⁷ By *information literacy* we mean competencies associated with defining an information need as well as locating, selecting, evaluating, and putting information to use. See the Association of College and Research Libraries (ACRL) and their *Information Literacy Competency Standards for Higher Education*, 2000 (accessed June 26, 2012).

In other cases, employers said they expected more from today's college hires than they had in the past. They looked for standouts—the most qualified candidates—who could demonstrate how they would plumb the depths of the Web's vast universe, teasing out information from threads found on blogs, wikis, or Facebook.

Figure 3: NACE Survey, Employers Rate the Importance of Candidate Skills/Qualities

Skill / Quality	Ranking
1. Ability to work in a team structure	4.60
2. Ability to verbally communicate with people inside and outside the organization	4.59
3. Ability to make decisions and solve problems	4.49
4. Ability to obtain and process information	4.46
5. Ability to plan, organize and prioritize work	4.45
6. Ability to analyze quantitative data	4.23
7. Possession of technical knowledge related to the job	4.23
8. Proficiency with computer software programs	4.04
9. Ability to create and/or edit written reports	3.65
10. Ability to persuade or influence others	3.51

NACE survey n = 244 US Employers. 5-point scale, where 1 = Not important, 2 = Not very important, 3 = Somewhat important, 4 = Very important, and 5 = Extremely important. Reprinted from the NACE 2011 Job Outlook, with permission of the National Association of Colleges and Employers (NACE), copyright holder.

Taken together, we concluded from our interviews that nearly all employees had similar expectations for *baseline information competencies*. In Figure 4, we summarize these seminal competencies.¹⁸

Figure 4: What Do Employers Expect from College Hires?

Baseline Information Competencies Needed at the Recruiting Stage
1. To know how and where to find information online, without much guidance
2. To use a search strategy that goes beyond Google and finding an answer on the first page of results
3. To articulate a "best solution" and conclusion from all that was found

Ordered from employers' most discussed to least discussed expectations from college hires; n = 23 participants

¹⁸ For purposes of our study, we defined *recruiting* as a hiring process that includes reviewing resumes and job applications and also interviewing prospective employees.

Although our interview results suggest employers' expectations for baseline information competencies at the hiring stage are fairly rudimentary, there is a plausible explanation. While employers said they required search basics from college hires, they assumed that additional training and inevitable mentoring would fill in the gaps that college hires might have—regardless of whether they had held internships at another organization while attending college.

As one employer explained:

Just getting out of college, they've been writing papers at the last minute, so they have to learn that research here is a slow process and you don't just get the quick answers and that every question opens up more questions and provides more information. I think everyone eventually learns this.

Employers like this one assumed that hires would need to learn the workplace's iterative problem-solving processes and how they differed from undergraduate research. This learning curve, they suggested, could take varying amounts of time, lead to varying degrees of mastery, and take place under different conditions.

As a result, we found that most employers placed a higher premium on candidates who exhibited openness to learning and natural curiosity. Few, if any, employers expected college hires to come to the workplace with a complete knowledge of industry-specific resources and/or procedures.

Joining the Workplace

Employers assigned a sweeping variety of research tasks to their college hires, according to our interviews. For example, hires were asked to locate information about industry competitors, IRS regulations, conference planning, the news coverage of a particular issue, and to survey scholarly research, identify potentially defective products, and examine court and/or politicians' voting records.

In other cases, college hires were asked to find information for software application training materials and/or technical coding specifications. As a whole, these tasks varied in complexity and length. Some took ten minutes to complete, while others took a few days, if not much longer. Predictably, employers found some college hires to be better researchers than others.

When we asked about the valuable information competencies college hires brought to the workplace, employers frequently mentioned their natural ease with computers. Many employers closely linked computer proficiency to the ability to find and use information.

As one employer explained:

The contrast is so evident between us on one side and them on the other side. They are connected in a way that my generation wasn't, which gives them all this solid background. There's this whole vocabulary they come speaking, you say something to them and they say, 'Oh, yeah, I can do that.' Information? They find it, they take it, and they blend it, they mash it up, they re-purpose it.

Another employer added:

Finding appropriate forums where they can shout into the crowd and see who responds, that seems to be something that they readily do, much more so, honestly, than some older folks who were not raised in that technology.

...most employers placed a higher premium on candidates who exhibited openness to learning and natural curiosity.

For young workers, using computers is second nature. They effortlessly and intuitively navigate them in a multiplicity of ways that their older cohorts would never consider. We found whether newcomers had learned these competencies through their formal education or on their own appeared to be of little consequence to most employers.

But when we specifically asked employers to assess how adept these new graduates are at finding and using information, many noted that the online proficiency they had prized at the recruiting stage turned out, in many cases, to be dismayingly limited. Most employers needed and expected more from their new hires, including research done more rigorously and more flexibly.

One employer said:

I am very happy with the young workforce that we've had—the young people that have worked with me, being able to find information and to find it quickly. Without a doubt, they are whizzes on that end of it. But, to know what direction to go in is where their weakness is. If they don't get the picture about what you're looking for and why you're looking for it, they can sit and just look at their computer screen wondering, 'how should I start?'

Another employer explained:

They do well as long as the what, when, why, and how is clear in advance. As long as they it doesn't require them to go past using a basic search engine, that is. It's that their toolkit and their whole sense of searching is limited. So, if you need to say, 'You use these tools, to look for these kinds of things and when you find a possible answer you need to evaluate it using this criteria.' You really have to lay it all out there so it's more test-like, if you can circumscribe the request, the better and better they do.

As these quotes suggest, being Web savvy and computer literate may accentuate graduates' abilities with obtaining and processing information—a competency today's employers claim to value highly. Unfortunately, while these proficiencies are necessary, they are also insufficient.

Employers need a broad range of information competencies that they may assume hires already possess for workplace research. Our findings suggest some of the employers that we interviewed may have mistaken technological savvy for research readiness.

Optimal Information Competencies

Every new job has its learning curve. However, we were struck by a trend in our interviews: many employers identified a widening gap between themselves and their tech-savvy hires when it came to solving information problems.

Our findings suggest the suite of information competencies that employers naturally assumed college hires would bring with them to the workplace—beyond simple searching—in fact, was sorely incomplete.

Moreover, the large majority of employers said they needed college hires who would take on information problems with “patience” and “persistence” and who possessed “a high tolerance for ambiguity” about both questions being asked and the answers being found. As a corollary of our interviews with employers, we identified four of the most frequently discussed information competencies that employers said they needed from new college hires—but rarely found.

...employers needed and expected more from their new hires, including research done more rigorously and more flexibly.

This skill set is a useful lens for more deeply understanding employers’ expectations. The competencies are some of the *optimal information competencies*.¹⁹ The results are summarized in Figure 5.

Figure 5: Competencies Employers Say they Need—But College Hires Rarely Demonstrate

Optimal Information Competencies for College Hires (according to employers)	
1.	Engaging team members during the research process
2.	Retrieving information using a variety of formats
3.	Finding patterns and making connections
4.	Taking a deep dive into the “information reservoir”

Ordered from most discussed to least discussed competencies; n = 23 interview participants.

Detailed Description: Optimal Competencies

(1) Engaging team members during the research process requires interdependent thinking in order to share, discuss, interpret, and revise findings. Employers we interviewed said college hires had more trouble with team communication strategies than with any other single aspect of the research process. Some employers explained that college hires simply overlooked the social capital team members, in particular, could bring to framing research questions and posing problems. Others said these new recruits thought of research as a task that was not conducive to collaboration. Instead, they simply wanted to “go to Point A and then march all alone to Point B.”

In the words of one employer:

What we need is someone who will go out and explore on their own and then come back to the team and say, ‘Here’s my best take, what do you think?’ They need that ability to invite discussion and be able to redirect on the fly. Here, we are really looking to get away from the drone mentality, you know, the ‘Yeah, I’m here and I’m doing exactly what you told me to do and I will continue like this forever for as long as I’m here.’

For employers, engaging team members was not only a workplace practice to be learned, but also often the most viable means of solving information problems. One employer told us that workplace research, unlike college research, is highly contextualized and collaborative—thus, experiential factors matter as much, if not more, than facts, figures or theories.

¹⁹ There may be additional information competencies, which employers would consider optimal but are not included here. We hope to identify them in our future research. In our report, Figure 5 shows the skills most frequently mentioned by the employers in our interviews, based on our coding results.

(2) Retrieving information using a variety of formats entails going beyond what can be found online. According to the employers we interviewed, this meant also using traditional, non-digitized formats, such as company reports, manuals, books, phone directories, old photographs, libraries—and institutional knowledge. Employers were surprised that few college hires incorporated off-line information sources into their research process. College hires, they suggested, sometimes make the mistaken assumption that they could find everything they needed online. Unfortunately, these hires simply “did not have the patience to trudge through this kind of old stuff.”

According to one employer:

Going through old records and stacks of paper and finding information in microfiche, they don't have enough patience to do that. To be able to decipher information out of an old book isn't there, but to find it on the Internet, find it on a Web site—it's quick, it's instantaneous, it's already put into a synopsis for them when they bring it up.

More than anything else, employers were dismayed by college hires' failure to recognize their colleagues as important information sources. With each passing year, they said, new hires are less likely to leave their workstations:

Here's something we're targeting in interviews now—the big thing is they believe the computer is their workspace, so basic interactions between people are lost. They won't get up and walk over and ask someone a question. They are less comfortable and have some lack of willingness to use people as sources and also have a lack of awareness that people are a valid source of information. Those hires that are the most successful are the ones who can find that balance between the computing workplace and the person-to-person workplace.

For employers like the one quoted above, searching online was a means, not an end, to solving information problems in the workplace. They told us that college hires needed to “move off the script,” “be resourceful and look in every place,” and “fact-check across multiple sources.” Above all, they said their hires need to “build a network for tapping into tacit knowledge” of the other people in the organization.

(3) Finding patterns and making connections involves analyzing what has been found and comparing related details that may exist in an array of sources. However, few college hires seem prepared to engage in this kind of higher-order thinking, according to the employers we interviewed. Some spoke about new hires who could not extract critical information from materials, or had difficulty “distinguishing the noise from the solid material.” Other employers said college hires had difficulty with synthesis and thus, they “get stuck in the mud trying to figure out what it all means.” We also found new hires were not necessarily habituated to finding useful patterns that held meaning:

They struggle with the broader challenge of cross-context integration—being able to pull in different sources and tie them together. For instance, the exceptional ones might find a law review article and then be able to internalize what they found and tell how this article ties in with other things they have seen during their search. Then some take a proactive step and seeing whether a policy that the law review article is built on is still valid, or not. These are the exceptional ones, the proactive ones, who become contributors by integrating other information to better complete the task.

Employers needed college hires to identify meaningful instantiations and to be able to argue for their importance or the value they add to solving the task at hand. As one employer said, “it's one thing go on the Internet and get the information, it's another thing to see potential connections, so you can find out what is not so obvious, too.” By their own admission, however, employers often overlook an applicant's ability to make connections between seemingly disparate elements during the interview process and so this skill may appear to have little value in the workplace.

(4) Taking a deep dive into the “information reservoir” requires researching a topic in extensive detail. In our interviews, employers claimed that college hires rarely conducted the thorough research required of them in the workplace. A frequent criticism of college hires was the premium they placed on finding the answer as quickly as possible:

Their ability to go deeper into the literature is very limited. I had new graduate hire who only searched for papers on Google. And I said, you're missing things, you need to use PubMed—everything is there and he just responded, 'Well, I did this quick search, and that's what I got.' But that's not good enough. Others will use easy sources, like Table of Contents services, with keyword filters, but I don't use them. It's easy—but it's not the most comprehensive. They're just picking out the easy stuff. For example, reading a paper, I always find 10 papers in the references, and I think 'Oh, I need those.' But I don't think there's a lot of that desire to go deep. They expect information to be so easy to get, that when it's not, it's frustrating to them. They've lived in a world where it's always been there.

Workplace research requires a strategy that imagines *all* possible answers—rather than conducting a cursory search to arrive at a quick conclusion after a few keystrokes. Employers want college hires who can “jump into the messy situations,” “read through stuff they may never use,” and apply “the dogged persistence” that research in the workplace requires. As one employer explained, a comprehensive research approach is essential because it solves immediate information problems and also sheds light on related issues critical for future work—the lifeblood of any organization.

Degrees of Difference: Bachelors vs. Masters

As a follow-up analysis in our study, we asked a subset of employers in our sample to compare the perceived differences between college hires who were coming to the workplace with an undergraduate degree (i.e., BA, BS) and those with graduate degrees (MA, MS).²⁰ About one-third of the sample had worked with new hires that had gone to graduate school before joining their workplace.

These employers considered hires with master’s degrees to be better prepared at solving information problems than those with undergraduate degrees. Why? Employers, in our sessions, said there were three benefits. Students who had had gone to graduate school are more experienced with defining and delineating an information problem, writing a literature review, and carrying out primary research.

Moreover, thesis writing gives graduate school hires experience with identifying original, often intractable, problems...

Intuitively, this makes sense. Conducting original research helps with learning the ropes of workplace research. Both types of research, according to the employers we interviewed, require thinking about research as a highly iterative process of critical inquiry.

Moreover, thesis writing gives graduate school hires experience with identifying original, often intractable, problems that are best researched using a *deep learning* approach. By deep learning, we mean the kind of higher-order learning where an individual is driven by researching and understanding patterns, relationships, and implications of a particular issue or topic.

Deep learners care more about intrinsic than extrinsic motivations, such as high marks and recognition from their committee members.²¹ Of course, the extent to which hires with graduate degrees are deep learners is beyond the scope of our study. ❖

²⁰ This follow-up analysis did not include graduates with specialized training, e.g., law degrees.

²¹ See PIL’s October 2012 “Smart Talk” interview with Ken Bain, a renowned educator and author, for more discussion about styles of learning in his book, *What the Best College Students Do* (Cambridge, MA: Harvard University Press, 2012) 34 - 41.

Part Two: Graduate Experiences

My situation? They hire you and put you in there and you just have to figure it out and they'll help you on the way but there not going to tell you the process—it's kind of trial-by-fire whereas in school it was always, 'Hey, this is how you approach the problem, this is what you are going to need to use to solve it.'

So far, we have presented findings from our interviews with employers, many of whom have been in the workplace for years.²² Our findings suggest employers have certain expectations about the competencies today's college hires will use to solve information problems. Yet once graduates join the workplace, their employers found their information competencies were often incomplete in ways they had not expected, and, in some cases, even imagined.

In this section, we turn our attention to recent college graduates who have just begun to make the transition from the campus to the workplace.²³ What is it like to be college hire in today's workplace?

In our focus group sessions with 33 recent graduates from four colleges and universities, we asked participants how finding and using information for college work differed from solving information problems in the workplace.

What challenges did participants face during this transition from one information landscape to the other? What information competencies, learned and developed in college, did they use for solving information problems in the workplace? What adaptive strategies did participants develop to gain an edge in the workplace?

Information Intensive

In 2012, US colleges and universities turned out an unprecedented number of graduates—an upward trend that is expected to continue.²⁴ Despite the rising costs of higher education, a large majority of graduates still consider their degree a good investment—most will out-earn their high school counterparts by about two to one as long as they can land and hold onto a “good job” and dodge the latest round of layoff notices.²⁵

Nearly three-fourths (73%) of the participants in our sessions had full-time jobs. They held a variety of positions, accountants, administrators, attorneys, bartenders, brew masters, business analysts, fundraisers, teachers, interface designers, insurance brokers, legal clerks, legislative aides, and waiters.

²² Almost two-thirds of the employers (64%) we interviewed had worked in their organization for five years or more. The majority of the sample (56%) had worked in their field, itself, for over 15 years.

²³ Nearly two-thirds of the sample (64%) of recent graduates in the focus group sessions had graduated within the past three years (2009 to 2011).

²⁴ In the 2011-2012 academic year, 833,000 graduates received an associate degree and 1,725,000 received a bachelor's degree from a US college or university—up by 60% from only a decade before. Source: The US Department of Education, <http://nces.ed.gov/fastfacts/display.asp?id=372> (accessed June 4, 2012).

²⁵ Pew Research Center, “College Graduation: Weighing the Cost ... and the Payoff,” (May 17, 2012). The article states: “When asked whether college has been a good investment for them personally, considering how much they or their family paid for it, fully 86% of college graduates say it has been a good investment. Only 6% say college has not been a good investment for them, and 7% say they are not sure.” <http://pewresearch.org/pubs/2261/college-university-education-costs-student-debt> (accessed July 19, 2012).

Others worked as marketing coordinators, medical technicians, musicians, nurses, program directors, and researchers. Some participants were working in their chosen careers while far more were uncertain about what direction their professional lives would take.

Almost all of the participants agreed that a primary part of their jobs required them to find, evaluate, and use information to solve problems. They said many of these problems seemed to appear randomly and quickly on their desks during the course of a workday.

For instance, a nurse discussed investigating new intervention methods, a project manager at a NGO combed the Web to find a speaker for an upcoming event, and a waiter needed to learn how to describe a selection of artisan cheeses newly offered on the menu.

In other sessions, a research analyst combed scholarly databases to find articles about spirituality and health, a musician looked for details about how to play a flourish for an upcoming performance, and a high school teacher searched for established strategies needed to back up certain instructional methods she planned to introduce to administrators and parents.

Taken together, most participants said they relied on two information sources to solve these kinds of information problems: Many said they jumped online first and pulled up a search engine, while others said they consulted a co-worker.

Despite their seemingly straightforward approach to workplace research, participants in our sessions said they felt “confused,” “distracted” and “scared.”

Dark Passage

The majority of participants in our sessions used similar adjectives to describe their strategies for solving information problems in their jobs. They described their approach as *consultative, efficient, evidence-based, fast, immediate, intuitive, and procedural*. Even though most of these adjectives suggest that solving information problems was a clear-cut process that college hires approached with ease and confidence, this was not the case at all.

Despite their seemingly straightforward approach to workplace research, participants in our sessions said they felt “confused,” “distracted” and “scared.” One participant admitted, “I’m constantly at the bottom of the learning curve.”

One source of anxiety stemmed from the realization that the course-related research they had done as undergraduates had much less to do with the workplace research than they had initially expected, or even imagined.

As one participant explained,

My job feels like there’s a perpetual thesis due, but my job is literally about finding information that does not exist. My information needs have changed and intensified since when I was an undergraduate.

In a larger sense, graduates found themselves grappling with making a critical information transition from the campus to the workplace in terms of both culture and practice. This tended to be the case whether they had had summer internships or not. This may be because every organization is unique, especially in terms of the iterative problem-solving process it employs and the information resources they make available.

But there is another plausible explanation. It has to do with the differences in the goals of a college assignment and those of the workplace. The information landscape that our participants knew from college supported their own learning goals. In contrast, the information landscape of the workplace supported the goals of an organization.

As such, the course-related research tasks they knew so well were smaller building blocks to help them acquire knowledge about a topic. In stark contrast, the task of workplace research was about developing a process to reach organizational goals (e.g., profit, innovation, and maintaining competitive edge).

An organization's strengths, weaknesses, opportunities, and threats made the arc of this kind of knowledge-building something entirely different than participants had experienced throughout their lifetime as students.

In the workplace, graduates were unplugged from the riches of their campus libraries. Whether they had frequently used library services and resources for research assignments while they were students, or not, the campus library had always been available to them.²⁶

Moreover, there were no faculty office hours. There were no handouts detailing steps needed for fulfilling research tasks. There was no syllabus that outlined what their workload would be from one week to the next. Workplace research tasks did not have a finite end date at the end of a semester or quarter.

What resulted for most graduates in our sessions was a difficult passage from campus to the workplace. We found the transition was full of surprising twists and turns that could make even straight-A students doubt their own capabilities.

In our sessions, participants most frequently discussed three challenges. All of them related specifically to their abilities to solve information problems in the workplace, based on the competencies and strategies they brought with them as hires and may have learned, developed, and used in college for course-related research. In Figure 6, we summarize these challenges.

We found the transition was full of surprising twists and turns that could make even straight-A students doubt their own capabilities.

Figure 6: What Makes Solving Information Problems in the Workplace Challenging?

Challenges in the Workplace (according to recent graduates)	
1.	An increased sense of urgency permeates the workplace.
2.	Research tasks are assigned with little structure or direction.
3.	Information seeking and use is highly contextual and fundamentally social.

*Ordered from participants' most discussed to least discussed challenges
n = 33 focus group participants*

²⁶ Only one participant in our focus group sessions recalled relying on an intranet that her special library had set up, though this was at an organization where she no longer worked.

Detailed Description: Transitional Challenges

(1) An increased sense of urgency permeates the workplace. More than anything else, workplace research was often encumbered by unrelenting deadlines, according to our participants. Most course-related research assignments were designed to spark thought at a slower pace and over a longer period of time. In the workplace, the difference could not be clearer. The deadline pressures of solving information problems in the workplace made participants feel hurried, vulnerable, replaceable, and in some cases, feeling like a jack-of-all-trades and a master of none.

As one participant commented:

So, I can tell you a little bit about health care policy, a little about education policy, and a little about public housing—but I can't tell you a lot about anything. I never have time to learn anything in depth because I have 20 other things to do. I don't have to write a paper on some topic, but just write a brief email to answer someone's question and then I move onto the next thing.

Other said that deadline pressures combined with what they considered as rising expectations from their superiors deeply influenced their information-seeking behavior. As a result, many of them admitted to curtailing their research strategies and using shortcuts for finding information in the workplace. As one participant explained, "You have to fix the problem or you could get fired—it's all a matter of deadlines."

According to another:

I find there is a lot of urgency in the workplace; it is not really your time so you can't dilly-dally and refer to different books and resources. As an undergrad you had so much more time, a whole semester to complete a project and you could take your time and you could do it when you wanted to. Now you don't—you can't—do that there are people up and down the chain and they want that answer and they want it now.

(2) Research tasks are assigned with little structure or direction. There was far less direction for solving information problems in the workplace, participants said. Workplace research is the process of solving information problems in a highly volatile organizational setting where change is a given. According to other participants, the lack of ongoing direction in their new jobs was "disorienting" and "scary," even though they had received some initial training when they were hired. As one participant explained, "definitions aren't nearly as clear cut, like grades and this is what an 'A' is." Another suggested, "With assignments in school, it was 'I want three sources from the Internet and I want you to at least use two books'—that just doesn't happen in the workplace."

Still another participant commented:

You're entering a world of paradox—your hand isn't held as much, but you have to get it done under stricter time frames. There is less structure to get things done and then again, there is less time to figure it out.

Yet some participants said they welcomed being untethered from the structure of classroom assignments. They no longer needed to adhere to grading standards dictated by some professor as they searched for the "right answer." Left to their own devices, most of the participants said they preferred using a linear strategy for conducting workplace research. As one young hire explained, it's about "getting from A to B and then getting paid for it." To a far lesser extent, participants said the answer mattered far less than the research process they used.

One participant explained:

Sometimes the right answer doesn't actually matter—it's how you get the answer, it's how you present the information you have, like, sometimes, you're just making it up at work, because flat out the right answer does not exist or maybe if it does exist you don't have access to it. In the workplace, it is more about how you deal with the situation that defines the course of a project. In academia, people care more about the right answer and not necessarily how the discussion went, or how you come off.

(3) Information seeking and use is highly contextual and fundamentally social. The social side of research mattered far more in the workplace setting than it had in college, according to participants. This situation made some participants feel confused and displaced. In the words of one participant, “the biggest hurdle for me was getting used to talking to strangers.” While others had discovered their expertise from college days with using online sources, books, and journals—and relying on the print-based sources (both online and offline) from their campus libraries—only went so far for them in their new jobs. Building knowledge in the workplace required tapping human-mediated sources, along with print sources:

I work in a design-based company and my undergraduate degree was in neurobiology, so I really did not know what in the hell I was doing walking into this job. It's been a lot of figuring out how do I do this or that. How do you find out how to design an icon for instance? How the hell do I know? So I go to someone I know is a really good visual designer and I say, 'Okay, can you teach me, can you do this for me, and then I'll watch and I will learn it.' At work, it's a lot about that social aspect.

Unequivocally, the personal lives of graduates in our discussion sessions were driven by digital communication. And yet, professionally, this generation of workers for whom research often begins by plugging keywords into an search box, also discussed how they learned that the traditional forms of research, like tapping the expertise of a trusted and knowledgeable teammate, could be more fruitful—and efficient—than they had ever imagined:

As a nurse, some nursing interventions come up I'm not familiar with—it's not always possible to stop and look up information. I may use a computer, but it's usually easier and quicker to ask an older nurse when looking up things. And sometimes when looking up something, it's not there. So I usually go to another nurse—people who you can identify as being knowledgeable, or I would probably ask my preceptor.

Taken together, the findings from our sessions suggest that college graduates recognize early on that they must alter their information-seeking behavior to fit the information culture and meet the demands of their fast-paced workplace. We found participants were at different stages of this complex transitional process. Some participants were closer to delivering the level of optimal information competencies employers said they needed, while other participants were still very far away from it.

Competencies with Staying Power

Participants in our sessions discussed the information competencies, based on their college experience that could be leveraged and applied in the workplace. Most frequently, these competencies revolved around extracting quality information from print sources. All in all, this broad skill set gave them an edge and saved them time.

In particular, participants discussed applying their ability to evaluate research sources, read texts closely and critically, deal with large quantities of information and synthesize the results, and frame research questions for implementing an iterative research strategy.

Some of these competencies had been formally learned through coursework and interactions with professors and/or librarians. Other competencies had been learned during college and appeared to be self-taught or acquired through an informal network of friends and/or classmates. We summarize these competencies in Figure 7.

Figure 7: Which Competencies from College Are Applicable in the Workplace?

Essential Workplace Information Competencies from College Experiences	
1.	An approach to systematically evaluating research sources
2.	Ability to critically read and analyze print sources
3.	Ability to synthesize large volumes of content and extract quality information
4.	The process of implementing an iterative research strategy by framing questions

*Ordered from participants' most discussed to least discussed essential skills for the workplace.
n = 33 focus group participants*

More than any other competency, participants credited their college training with making them critical evaluators of information. Most took the information they had found with a grain of salt. Participants in our sessions discussed how they judged sources using the traditional standards of timeliness and authority, derived from librarianship and the scholarly print world.

When they conducted workplace research, they asked the same questions. Is this information up-to-date? Is the author a credible source? Their ability to determine the validity of scientific articles served some participants well. These participants said they knew to look at sample size and how to detect bias in the findings and “figure out where the author was coming from.”

Other participants said they relied on their “close reading” competencies from humanities and composition courses when solving information problems in the workplace. In their words, their formal education had taught them to “actively read and how to read to retain information” and “how to digest information so you think better.”

As one participant explained:

In college, I learned how to read with the grain and then against the grain. I've learned to examine the source and the biases as I read. So, I read to agree and then I read with skepticism. It also helps to better evaluate the source. But it all depends on what kind of information it is, it doesn't always apply—I mean molecular weight is pretty set.

Still, other participants had learned the value of synthesizing large volumes of content, which they needed to do throughout their education, no matter what their major had been. The competencies honed during college saved them precious time in the workplace as they sifted through results to find the best material.

More than any other competency, participants credited their college training with making them critical evaluators of information.

The participant said:

I was a history major and I learned how to synthesize and evaluate the quality of information and I learned how to read a lot of different things that sort of said the same thing and pick which one said it best and why it said it best. Some of it is building a broader lexicon and being able to figure out what words mean the precise thing they are intending to say.

While many participants admitted they were innately curious before going to college, their formal education had made them even more inquisitive. College prepared them to ask the right questions and find answers in the workplace. As one participant said, “the value is having a process and be critical of that process, find additional paths, develop opinions and ideas, and question things.”

According to one recent graduate:

There isn't one answer to a question—there are lots of ways to look at a question. I have researched other companies to gain an advantage in negotiations here—my college education was really about looking at questions from different ways. As one professor said, ‘If you are trying to answer a question about politics, don't just read about politics.’

Despite the skill set participants may have brought with them, many of the participants in our sessions felt like they were still in an “adapt or die” period of transition. They soon discovered that the competencies they were accustomed to using during college were limited. Consequently, many participants explained how they needed to learn the culture and practices of the new information landscape. If they did not acculturate then they would fail, or, at worst, be fired.

Adaptive Strategies

Most participants discussed a set of adaptive strategies they had developed for closing the gap in their set of information competencies. Some strategies had been learned through formal channels, such as training and mentoring, provided through the workplace.

In many other cases, however, participants developed different strategies on their own, often on an individual basis “through intuition,” “trial and error,” or “just figuring things out yourself, more than anything else.”

Participants discussed a variety of techniques. For example, they relied on their supervisor as an information source. They consulted trusted coworkers for answers and guidance. They went to online forums, especially when grappling with technical problems.

...the adaptive strategies many participants discussed involved the cultivation of social capital in the workplace.

And even though techniques varied among the participants, there was a common thread in our discussions: the adaptive strategies many participants discussed involved *the cultivation of social capital in the workplace*.²⁷

By this, we mean participants developed relationships with people they could use as information sources, and in a broader sense, to build knowledge.²⁸ For instance, a majority of participants

²⁷ Lloyd, *Information Literacy Landscapes*. Other researchers have addressed the importance of the social side of research in their studies of workplace information literacy using the theory of social constructivism.

²⁸ For purposes of our report, “social capital is about the value of social networks, bonding similar people and bridging between diverse people, with norms of reciprocity.” Source: The Social Capital Research Web Site, maintained by Tristan Claridge, University of the Sunshine Coast, Mooloolaba, Queensland, Australia, <<http://www.socialcapitalresearch.com/contact-us.html>> (accessed August 8, 2012).

discussed how they relied more on their supervisors than on online searches. In their words, their motivation was driven by "protecting yourself" and/or saving time, since it was "the fastest way" to solve information problems.

As one participant said:

My approach is to always get stuff done as quickly as possible, so I have a habit as soon as something comes up I call the boss—just get it done as fast as possible, instead of taking time by myself to look up an answer, I'll try to figure out the fastest way to do this.

In other cases, participants said they turned to their supervisor since Google was not smart enough for finding the highly contextualized information they needed for workplace research. These participants said they were surprised to find human-mediated sources trumped a Web search time and time again:

I've learned through trial and error the person you go ask is your supervisor because processes change constantly, so co-workers give you the most current processes, but it is the supervisor who will give you the reason behind why something is being done this way or that way. So, rarely, do I go to the Internet to ask for any information because I work in accounting where processes change constantly.

Some hires developed an informal mentoring relationship with a trusted coworker, sometimes a supervisor, sometimes not. This strategy was particularly helpful for learning terminology and certain work processes, especially for participants who worked in a field that was very different from their college majors:

I am a science major now working in software field that deals with accounting and finance. Just in my daily interactions with my clients they talk in accounting and finance terms and I have to learn these things, so I can be able to interact with them—it's not something I went to school for. I have to ask my co-workers or do the research to become familiar with their processes so I can help clients and even be able to even relate to them.

To a lesser extent, other participants relied on a two-step strategy—checking online first for background and then engaging a co-worker. These participants said they needed to "feel confident" before asking questions of someone else:

I try to do some preliminary research before I go to people, so I have some idea of what I'm talking about—I try to get as much information as I can and then use people as the validation and to fill the gaps and get more information and then probably go back to the Internet to expand the net, I'd look for books, I'd look for articles and then if I couldn't find anything I'd head to the library or the bookstore.

Lastly, there were participants who used computers and networked knowledge as a way of reaching out to experts. These participants said used online forums especially when tackling technical problems:

I'm sure everyone around this table knows to just Google it, if you can't find anyone to answer your question at work, there has to be someone somewhere who must have answered that question before. When you're expected to trouble shoot something and the path you were supposed to take was calling the institutional help desk that handles 11,000 people at the hospital where I work and you could be on hold forever—so I just figure out something easy to get what I need.

Taken together, many participants developed strategies for cultivating relationships in the workplace to increase their efficiency at finding information. In particular, they developed a relationship with a subject matter expert who provided some situational context about work processes, procedures, expectations, surrounding circumstances, and how to meet the needs of an assigned research task.²⁹

Some participants were surprised to learn that using co-workers as information sources often had more value than their typical strategy of “Googling it.” Not only could they locate information more quickly, but also the information they received was contextualized to the needs of their work setting in ways that online information was not.

Yet, notably, we found very few participants went so far as to develop a social network with team members. As such, the optimal skill that employers in our interviews said they needed most—approaching team members—appeared to be a strategy the fewest participants discussed developing and/or using. Instead, our findings suggest that college hires may learn to cultivate and use social capital in the workplace one co-worker at a time.

Solutions from the Field

As a follow-up to both of the findings sections in this report, we present two solutions we heard from those who participated in our study samples. One of the most intriguing solutions came from an employer who described the success his department had when college hires worked in paired teams to solve ill-structured information problems in their complex organization.

This alchemy worked well when a young hire was partnered with an experienced employee. The young hire demonstrated know-how for using computers and navigating digital spaces. The more senior employee knew how to frame and reframe research questions.

The seasoned employee also lent context and meaning to the results, explaining what the data might mean, its implications for workplace practice, and how the research process might be revised to elicit deeper meaning. In the end, if all went well, the newcomer often learned the value of interdependent thinking and could recreate the process in the future.

Another account about acquiring workplace preparedness came from a college graduate in a focus group session. This participant described how a professor in an upper division chemistry lab gave an assignment but left out the typical steps and procedures needed for solving the problem.

Instead, the professor asked students to figure out on their own how a problem could be solved and the necessary lab machines could be used in the solution. As the student recalled, “it just blew me away, I’d never had that kind of experience before, but it sure weeded out those of us just doing the steps compared to those of us who could find and use information effectively.”

Another focus group participant described his involvement with extracurricular activities during college, highlighting the management of a performing group on campus. In this position, tasks included researching information for preparing programs, figuring out where to get them printed, working with people to find and reserve performance locales, and finding information about tax regulations and work with accountants to make the forms were correctly submitted.

In both of these graduates’ cases, these experiences involved using competencies, some information, some planning, that matched the experience of the job these participant held today. For these graduates, the multifaceted educational experience gave them a smorgasbord of challenges and a taste of experiences that may help to prepare them for what lies ahead. ❖

²⁹ For more details about the concept of *situational context* in the college setting, see Alison J. Head and Michael B. Eisenberg, “Lessons Learned: How College Students Seek Information in the Digital Age,” Project Information Literacy: 2009, 7 – 18 <http://projectinfolit.org/pdfs/PIL_Fall2009_Year1Report_12_2009.pdf> (accessed August 9, 2012).

Conclusion

Since 2008, we have studied how college students conduct research and find information both for their coursework and to meet the demands of their everyday lives in the digital age. We have surveyed over 11,000 undergraduates from more than 60 colleges and universities in the U.S. as part of our ongoing research. In the course of our efforts, the research has become a study of the gaps we have discovered between how students find and use information and the expectations instructors and librarians may have about their information-seeking behaviors.

In our latest project, the first in our Passage Studies, we set out to understand what happens to college students once they graduate and make the critical transition from the campus to the workplace. We interviewed 23 employers with experience hiring and supervising college graduates, and held five focus group sessions with a total of 33 recent graduates.

Overall, our findings from this exploratory study suggest there is a distinct difference between the information competencies and strategies today's graduates bring with them to the workplace and the broader skill set that more seasoned employers need and expect.

Moreover, we found the rapid-answer approach many college hires in our sample took for solving information problems hampered their ability to demonstrate the very research competencies employers we interviewed claimed to need most in the workplace.

Nowhere was this divide between employers and graduates more apparent than when each group discussed its best strategies for solving information problems on the job. The employers we interviewed said they expected young hires to be patient but persistent researchers.

Specifically, employers said they needed them to be capable of engaging co-workers in an iterative research process, retrieving information in a variety of formats, identifying patterns in an array of sources, and diving into sources of information.

Yet these information competencies were rarely demonstrated, according to employers. Most newcomers, they said, had a tendency to respond too quickly with answers conveniently plucked from the nearest source. At worst, they said, some college hires solved information problems with a lightning quick Google search, a scan of the first couple of pages of results, and a linear answer-finding approach.

The Rest of the Story

Our focus groups with graduates provided a plausible explanation for why this strategy was used and what "optimal" competencies may mean to them. First, many recent college graduates in our sessions struggled to make their transition to a workplace where their information-seeking was driven by an urgent pace that was foreign to many of them.

Graduates soon discovered that the workplace pace moved more quickly and less predictably than the academic calendar. For example, workplace research "assignments" could change direction at a moment's notice as allocation of resources changed, team members came and went, and external factors impacted how organizations made decisions. Second, focus groups members said they received little guidance from employers about research expectations in the workplace.

...there is a distinct difference between the information competencies and strategies today's graduates bring with them to the workplace and the broader skill set that more seasoned employers need and expect.

Accordingly, graduates in our sessions responded to the constraints of their new setting by either jumping online to do a Google search or asking a nearby co-worker for answers to information problems.

Why? Our findings suggest graduates wanted to prove to employers they were hyper-responsive and capable of solving information problems in an instant—a response they perceived employers wanted from them, based on their interviews and how dazzled some employers were with their computer proficiencies when they first joined the workplace.

As one graduate explained, "When you start working it becomes more that you want to demonstrate to the people that you work with and you work for that you can generate this information quickly, so whenever there is a need, you will go to the fastest source, the most reliable source."

The findings illustrate the different mindsets both employers and graduates may bring to solving information problems. In other words, employers look for college hires who are comprehensive researchers but often make hiring decisions based on a cursory assessment of the graduate's information-seeking skills. College hires, in turn, presume they have been hired for their ability to find information quickly with their handful of computer skills that often got them through the door in the first place.

Further, these findings help explain why so many graduates in our sessions appeared to assume that any question could be answered as soon as with the "right" source of information. Still, however, employers in our interviews needed and expected newcomers to make "reflective judgments"—to construct knowledge and new interpretations from all the different answers they had found.³⁰

Taken together, these findings might explain why college hires may be as surprised by the information competencies needed, as employers are by the practices most new hires fail to bring with them to the workplace.

Early Stages of Transition

By far, the most revealing details about how today's graduates adapted during the information transition process concerned their use of social capital in the workplace. These findings offer a fascinating snapshot of a critical information transition that is unfolding.

Many of the graduates in our sessions said they leveraged information competencies they had perfected during college as they were acclimating to their new workplace. These competencies were useful for extracting quality content, such as critically evaluating materials and/or synthesizing large volumes of content.

But even though these competencies had value for graduates, they had limited value in the workplace. Newcomers usually sensed they were coming up short. On this rocky learning curve, many participants said they also needed to develop adaptive strategies, which they often figured out on their own by trial and error.

Our findings suggest graduates wanted to prove to employers they were hyper-responsive and capable of solving information problems in an instant...

³⁰ See a discussion of Patricia King's and Karen Kitchener's research about thinking and problem-solving methodologies in *What the Best College Students Do* (Cambridge, MA: Harvard University Press, 2012) for more discussion about styles of learning, 151 - 157. *Reflective thinking* is the highest stage of problem solving, where individuals construct their own knowledge, based on what the information and data they have found and critically questioned, in order to reach decisions about solving ill structured problems. For King's and Kitchener's Web site about reflective judgments, see <<http://www.umich.edu/~refjudg/index.html>> (accessed August 23, 2012).

These strategies involved going beyond their computers and cultivating social capital. By this, we mean they leveraged the expertise of one co-worker at a time in order to find answers, save time, learn the ropes, and protect them from making mistakes at best and being fired at worst.

According to participants in our sessions this was different from the college research process they knew so well—one that involved relying on the printed word (either online or a hard copy) for information and working alone to complete assignments. Many graduates explained they had discovered that turning to a co-worker, often their supervisor, as an information source trumped tapping out a search on computer.

Despite these efforts to develop new strategies, employers we interviewed had different expectations for how to employ the social side of research. They expected college hires to develop and use social networks with many stakeholders—not just one trusted co-worker at a time.

More than anything else, employers in our sample were dismayed that many of today’s college hires came to the workplace unprepared to sit down and engage members of a collaborative team during the research process. If new hires did this more often they might have better chances of solving the messy problems of the workplace. But, then again, this required new hires “moving off the script” and “imagining all the possible answers out there”—something that few of them did.

The qualitative data we have collected lay the groundwork for a preliminary model about the information transitions young adults may go through as they join the workplace. The data describe how new hires may take the first steps toward learning necessary information competencies on the job—and how far they may still need to go. Moreover, they suggest many college hires use trial and error, and to a far lesser extent, training and mentoring when developing adaptive strategies.

Disappearing Competencies

Overall, our findings suggest a dramatic shift is occurring in the workplace related to how information is found and used. We found the traditional research competencies—the use of non-digitized information sources—may be disappearing with each passing year as a new batch of college hires joins the workplace and employers make assumptions about their information competencies.

We found that few, if any, of the employers we interviewed said they hired college graduates solely because they could solve information problems in record time. Yes, employers recruited hires with the ability to conduct online searches. At the same time, however, other qualities also mattered.

In particular, employers expected hires to possess low-tech research competencies, such as the ability to make a phone call, to poke their heads into a co-worker’s office to ask a question, to interpret results with a team member, or to scour a bound report. However, many fresh-from-college hires sorely lacked these traditional research competencies.

These low-tech information skills are essential to the workplace research since so much information in the workplace is contextual and highly individualized to the operations of the organization itself. But many of these young adults considered perusing the index of a print volume or picking up the phone to consult a colleague as outdated as using an adding machine to balance the payroll.

These findings, of course, warrant further investigation. But they are certainly plausible as more and more information becomes digitized, as each new crop of college graduates is more than likely to be “born digital,” and as employers continue to make hiring decision based on online information-gathering proficiencies.

We found the traditional research competencies—the use of non-digitized information sources—may be disappearing with each passing year...

Caveats

Taken together, our findings shed light on the divide between college hires and their employers when it comes to conducting workplace research and solving information problems. They enrich our understanding about the information-seeking strategies of college hires and the expectations and needs of their employers—two separate stakeholders in the workplace, often worlds apart in their time spent in organizations, their year of graduation, and their hours logged onto computers.

At the same time, it is important to acknowledge the limitations of this exploratory study, the first in our ongoing inquiry about critical information passages that young adults experience. First, most of the employers we interviewed were not dissatisfied with the latest crop of college hires. They knew that young hires need time to grow into their new positions, and will do so in varying degrees of mastery and over time.

Second, our data do not tell us whether graduates in our sample may have used a comprehensive research approach for course-related research assignments while they were in college, or not. This, of course, raises additional questions. Our previous findings from prior PIL studies revealed findings related to this study's findings.

In our earlier studies, we found that a large majority of students used an information-seeking strategy driven by efficiency and predictability for managing and controlling all of the information available to them on college campuses.³¹ Does this mean that many graduates are simply applying more of the same in the workplace, and just using different techniques and working under tighter constraints to achieve similar information seeking efficiency?

Lastly, our findings from this exploratory study are not generalizable to a larger population of either employers and/or graduates, given our sample size and methods. We plan to rigorously test the qualitative findings we report here in a future study using a large-scale survey and quantitative methods. As we refine the questions we ask in our future research, we still have much to learn. The insights gained from this study are particularly relevant to those charged with preparing and teaching young people how to be effective information seekers in the digital age.

Even though information literacy has been linked with lifelong learning, scholarly researchers have grappled with how to measure the attainment of this lofty goal...

Future Research

This PIL report is an extension of our previous work about libraries, their use on campuses, and information-seeking practices and techniques that college students used. In these pages, we have focused on the information-seeking behavior of today's college graduates, their preparedness, and their adaptive strategies, as they go through critical junctures in their lives. Our investigation has occurred at a critical time in the academy when more students than ever have come to view their college education as a commodity that makes them more competitive in today's job market.

At the same time, our report is intended to give readers a deeper understanding about the different kinds of research strategies students need and are expected to have beyond the academy, especially as lifelong learners. Even though information literacy has been linked with lifelong learning, scholarly researchers have grappled with how to measure the attainment of this lofty goal. Comparatively few

³¹ Alison J. Head and Michael B. Eisenberg, "Truth Be Told: How College Students Evaluate and Use Information in the Digital Age," *Project Information Literacy*, 2010
<http://projectinfolit.org/pdfs/PIL_Fall2009_Year1Report_12_2009.pdf>(accessed August 9, 2012).

library and information science researchers have delved into studying workplace information literacy, especially as it may apply across a spectrum of workers in different kinds of organizations.³²

In this spirit we hope our findings will enrich our understanding of these issues and stimulate discussions, debate, and innovative ideas. Moreover, we hope that our findings will aid librarians and educators with their ongoing efforts to make reference and information literacy instruction truly integrative with student learning processes. This is particularly relevant for not only readying students for college-level research but also as lifelong learners.

Accordingly, this report raises more questions for librarians than it answers. What should a holistic approach to teaching information literacy in educational settings look like? In terms of the search process, how could librarians address the social side of research? How can reference be re-imagined to give students more experience with the process of interdependent thinking as the research process unfolds and is revised?

As our own investigation about the day after graduation continues we have additional questions we plan to explore using a large-scale survey and quantitative methods. We hope to further study how graduates read the cues of the workplace information landscape.

What influences graduates to adopt certain information-strategies in the workplace? What sources do they turn to once they can no longer consult the rich collection of campus libraries? Are search engines the first stop for workplace research, or are co-workers? What role, if any, do public libraries play in the research process, both for work and in their everyday lives as lifelong learners?

Finally, the goal of our future investigation is to use these questions to make informed recommendations to stakeholders—librarians, educators, employers and students—about how graduates may be best prepared for adapting to their new settings as information problem solvers in the digital age. ❖

³² For further discussion of these issues, see Annmarie Lloyd and Kirsty Williamson, "Towards an Understanding of Information Literacy in Context: Implications for Research," *Journal of Librarianship and Information Science*, 2008, 40:1, 3 - 12.

Appendix: Methods

The Project Information Literacy Research Team used telephone interviews and focus groups to collect the qualitative data during January 25 through May 22, 2012. We conducted 23 in-depth interviews with employers about their expectations and needs of recent graduates and their ability to solve information problems in the workplace.

We also moderated five 1-hour sessions with 33 recent graduates from four US colleges and universities to collect data about their research habits, behaviors, and experiences. In these sessions, we investigated how the participants applied what they had learned in college to the workplace and to their lives.

Purpose

The purpose of this study was to explore how today's early adults use existing information competencies and adopt strategies for solving information problems once they graduate from college and join the workplace.

From a disciplinary standpoint, our study investigated the deeper issues of workplace information literacy and lifelong learning.³³ Little research has been done in the library and information science field about these two interrelated types of information literacy and much of this has been conducted outside of the US.³⁴

From our literature review of workplace information literacy, we found three seminal findings from prior research studies: (1) information literacy is a vital and necessary component of successful learning organizations that remain competitive, (2) workplace information literacy is substantially different from educational information literacy, and (3) workplace information literacy is highly contextualized and dependent on learning from people, far less so than mastering textual sources.³⁵

In this exploratory study, we built on these prior findings to define our three research goals:

1. To examine the preparedness of college hires for solving information problems in the workplace, based on employers' accounts;
2. to explore the development, practice, and adaptability of information competencies and strategies that college hires use in the workplace; and
3. to enrich our understanding of the gaps that may exist between employers' expectations for workplace research competencies and those that college hires demonstrate.

³³ For purposes of this investigation, we define (operationalize) the concept of *information literacy* as the ability to find, evaluate, and use information.

³⁴ As part of the background literature review conducted for this study, we made a preliminary search of OCLC's global library catalog for "information literacy" and found over two-thirds (71%) of the records for materials published about information literacy and education. By comparison, there were far fewer records (6%) for information literacy and the workplace. Search conducted on April 4, 2012.

³⁵ For a current and extensive review of the literature about workplace information literacy and lifelong learning, see Sharon Weiner, "Information Literacy and the Workforce: A Review," *Education Libraries*, 2011, 34:2, 7 -14 <doi: 10.1177/0961000607086616 10.1177/0961000607086616>.

Human Subjects and Confidentiality

Prior to data collection, the PIL research protocol for this study underwent Human Subjects Division Review and received approval at the University of Washington (UW), where Project Information Literacy was based at the time.³⁶ UW's Human Subjects' reviewers determined that PIL's proposed study plan was exempt. That is, the study was exempt since the research was about the effectiveness of classroom methods and instructional techniques.³⁷

As a condition of ethical research practices, participants we provided both a verbal and written consent to all the participants. The consent informed them of the voluntary nature of participation, an explanation of the purposes of the research and the expected duration of participation, a description of the procedures to be followed, and assurances of confidentiality of the data and anonymity of their identity, as well as contact information for the principal investigator.

All measures were used to protect any identifiable data (e.g., each participant was assigned a unique identification code; all responses and code keys were stored separately in locked files or on secured computers). No study participants in either sample have been identified in relation to comments and quotations used in any reports resulting from this research.

Study Participants

We used two samples of voluntary participants: (1) employers who hired, trained, and/or supervised recent college graduates in either entry level position and/or as post-college interns in their workplace; and (2) recent graduates from both four-year and two-year US colleges and universities.

We interviewed one employer per organization. Our sample of organizations included a range of industries, such as engineering, financial services, government, media, technology, and transportation.

We collected demographic data about each employer interviewee and his or her workplace setting. Figure 1 (next page) provides an overview of the demographic make-up of the interviewee sample. Nearly two-thirds of the sample was male (61%). Most interviewees were employed in their organization as either executive directors (39%) or mid-level managers (39%). To a lesser extent, some interviewees (22%) were professional staff (e.g., scientists, attorneys, librarians).

Interviewees had been employed at their organization for different lengths of time. Almost a third of the sample (30%) had been employed at their organization for over 15 years. Another quarter of the sample (26%) had only been working at their organization for one or two years. More than half the interview sample (56%) had been working in the same field for more than 15 years.

We also collected data from interviewees about the types of graduates they had discussed and described during our interviews. Almost two-thirds of the sample said they discussed post-college graduates (BA/BS) in entry-level positions (65%) and/or in internships (61%). Far fewer of the interviewees had discussed post-graduate school graduates (MA/MS) who they had hired in entry-level positions (26%) and or paid, full-time post-college internships (9%).

The largest percentage of interviewees (43%) reported their organization tended to hire new graduates with arts and humanities degrees. Other interviewees said they hired recent graduates with degrees in business administration (22%), engineering (13%), social sciences (9%), computer science (4%), the sciences (4%), and occupational training programs (4%), such as nursing and Web design.

³⁶ The PIL Research Protocol for this study was approved by the University of Washington, Human Subjects Division and was granted a Certificate of Exemption (#42044) on December 14, 2011. The protocol title was "Life-long information Expectations and Competencies."

³⁷ This is one of the qualifications exempt research studies require according to the Department of Health and Human Services and FDA regulations for scholarly research involving human subjects.

Appendix, Figure 1: Employer Interview Sample

Employer Demographics	Count	Frequency
At a glance	23	100%
Total interviewees in the sample	23	100%
Total organizations represented		
Gender		
Female	9	39%
Male	14	61%
Job title of interviewee		
Executive level director/manager	9	39%
Mid-level manager	9	39%
Professional staff (e.g., attorney, librarian)	5	22%
Years employed at organization *		
1 – 2 years	6	26%
3 – 4 years	2	9%
5 – 6 years	3	13%
7 – 8 years	3	13%
9 – 10 years	1	4%
11 – 15 years	1	4%
Over 15 years	7	30%
Years in the field		
1 – 2 years	3	13%
3 – 4 years	0	0%
5 – 6 years	2	9%
7 – 8 years	0	0%
9 – 10 years	1	4%
11 – 15 years	4	18%
Over 15 years	13	56%
Classification of interview setting		
Engineering	1	4%
Financial services	3	13%
Government	3	13%
Healthcare/research	1	4%
Hospitality (inc. lodging)	1	4%
Management consulting	1	4%
Manufacturing	2	9%
News/media	4	17%
Policy/research	1	4%
Technology (e.g. library services)	3	13%
Technology (e.g. consumer products)	2	9%
Transportation	1	4%
Types of recent hires discussed		
Post-college (BA/BS) internships	14	61%
Post-college (BA/BS) entry hires	15	65%
Post-graduate program (MA/MS) internships	2	9%
Post-graduate program (MA/MS) entry hires	6	26%
All of the above	3	13%
Disciplinary fields of hires		
Engineering	3	13%
Arts and humanities	10	43%
Business administration	5	22%
Computer science	1	4%
Occupational programs (e.g., nursing)	1	4%
Social sciences	2	9%
Sciences	1	4%

n = 23

* Percentages may not add up to 100% due to rounding

Recent Graduates

Thirty-three recent graduates participated in our focus groups. Demographic details about this sample are summarized in Figure 2.

Appendix, Figure 2: Focus Group Sample with Graduates

Graduate Demographics	Count	Frequency
At a glance		
Total graduates in focus groups	33	100%
Total number of US campuses	4	100%
Total number of one-hour sessions	5	100%
Gender		
Female	20	61%
Male	13	39%
Year of Graduation *		
2011	4	12%
2010	6	18%
2009	11	33%
2008	4	12%
2007	4	12%
2006	1	3%
2005	3	9%
Age range		
23 to 25 years old	16	49%
26 to 30 years old	12	36%
Over 30 years old	5	15%
Undergraduate major *		
Arts and Humanities	10	30%
Business Administration	1	3%
Occupational training, inc. nursing	3	9%
Sciences	7	21%
Social Sciences	7	21%
Double Majors	5	15%
Grade Point Average (GPA)		
2.1 to 2.3	1	3%
2.4 to 2.6	2	6%
2.7 to 3.0	4	13%
3.1 to 3.3	9	27%
3.4 to 3.7	13	39%
Over 3.7	3	9%
Declined to state	1	3%
Degree granted *		
BA	28	85%
BS	1	3%
AA or Certificate	4	12%
Current employment status		
Full-time employment	24	73%
Part-time employment	6	18%
Self-employed	1	3%
Not currently employed	2	6%

n = 33

* Percentages may not add up to 100% due to rounding

More participants had graduated in 2009 (33%) than any other year in our study. A large majority of the graduates (85%) had received a BA. More participants in the sample had majored in arts and humanities (30%), social sciences (21%) and the sciences (21%).

Other respondents were in occupational training programs, including nursing (9%) or had been double majors (15%) or had studied business administration (3%). The most frequently reported grade point average (GPA) was in the category of 3.4 to 3.7 (39%). As a point of reference, we calculated this GPA as between a B+ and an A-.³⁸

Nearly two-thirds of the sample was female (61%). A large majority of the sample (85%) were under 30 years old, which make them members of the plugged-in Net Generation (i.e., born between 1983–1992). The large majority of participants (73%) had full-time employment.

Sampling Plan

By far, the most time-intensive part of this study involved recruitment for the two samples. We used multiple methods in order to reach out to potential study participants for the study.³⁹

Recruiting Employers

To generate a list of potential employer interviewees, we began by consulting three online sources: (1) Vault.com, (2) Idealist.org, and (3) an online list from an internship fair hosted in the University of Washington's Information School, where PIL was once based. For a summary of demographic variables in the employer sample see Figure 3 on the next page.

Our goal was to identify individuals within the sample employers who directly hired, supervised, and evaluated interns or entry-level recent college graduates. From these sites, we could identify a list of potential contacts. Next, we searched recruiting pages looking for individual contact information. This method proved to be most time-consuming while yielding four interviewees (17%) for our sample.

We also met with internship coordinators and career services offices at the University of Washington Information School, California Maritime Academy, and Ohio State University, where PIL research team members for this study were also employed. These internal gatekeepers had direct contacts with employers who were responsible for hiring and supervising the members of our samples. Using this method led to seven employers (31%) who consented to interviews.

Additionally, we relied on trusted colleagues to post a call for study participation on listservs and/or send an email to a defined group of potential interviewees. This approach was the most successful for us, adding nine interviewees (39%) to our study sample.

As a final step, we called organizations that were well known for offering graduate internships, based on the list from Vault.com (e.g., Smithsonian, Mother Jones, and Capital Fellows Program). In several cases, after we explained our study, were able to obtain a potential interviewee through a human resources department and internal internship coordinator cooperation and support. Cold calling gave us three more interviewees (13%).

³⁸ For purposes of our analysis, we use the University of Washington's scale for translating GPA to letter grades, courtesy of the Office of the Registrar, at http://www.washington.edu/students/genclat/front/Grading_Sys.html, (accessed June 1, 2012).

³⁹ We thank Freeda Brook, a member of the PIL Research Team and a graduate student in the University of Washington's Information School, for carrying out the steps of the sample plan for the employer stakeholder interviewees and writing this summation about the steps she took.

Appendix, Figure 3: Organizations Represented in the Employer Interviews

	Location	Employee Count	Industry Classification
Battelle Memorial Institute	Columbus, OH	24,500	Engineering
BlueKai	Bellevue, Washington	42	Technology (consumer products)
Brookings Institution	Washington, D.C.	450	Policy/research
Capital Fellows Program	Sacramento, CA	11	Government/Educational
Credo Reference	Boston, MA	14	Technology (library sector)
Discovery Communications	New York, NY	4,600	News/media
FBI	Washington, D.C.	38,850	Government
Fluke Manufacturing	Everett, WA	4,000	Manufacturing
Fred Hutchinson Cancer Research Center	Seattle, WA	3,207	Healthcare/research
KPMG	Seattle, WA	140,000	Financial services
Marriott International, Inc.	Bethesda, MD	120,000	Hospitality (lodging)
The Media Consortium	Washington, D.C.	2	Media/news (nonprofit)
Microsoft	Redmond, WA	90,000	Technology (consumer products)
Mother Jones	San Francisco	59	Media/news
Nationwide Insurance	Columbus, OH	36,023	Financial services
OCLC	Dublin, OH	1,058	Technology (library sector)
Pariveda Solutions	Dallas, TX	350	Management Consulting
Port of Los Angeles	San Pedro, CA	16,000	Transportation
The Press Democrat	Santa Rosa, CA	316	News/media
Price Pump	Sonoma, CA	27	Manufacturing
Serial Solutions	Seattle, WA	200	Technology (library sector)
Smithsonian	Washington, D.C.	6,300	Government (museums)
SS & G Financial Services, Inc.	Cleveland, OH	414	Financial services

n = 23 US organizations

The amount and quality of information about positions varied significantly from employer to employer, and some of the information was proprietary, as with the Vault.com database of internships. Although we were able to identify an individual contact for some of the employers, the process was invariably time-consuming and the information always needed further verification.

Recruiting Recent Graduates

There were 118 institutions of higher learning in its PIL Volunteer Sample at the time of this study.⁴⁰ We relied on this sample as a basis for generating our sample of recent graduates for the focus groups. The chart in Figure 4 (below) shows a breakdown of the focus group sample details.

Our sample was made up of private four-year institutions (50%), and to a slightly lesser degree public four-year institutions (25%) and community colleges (25%). Figure 3 shows baseline information about each institution from which we selected the recent graduate sample.

Appendix, Figure 3: Educational Institutions Represented in Focus Groups

	Research Liaison	Institution Type	Current FTE ¹	Information Literacy Training Modules
Harvard College	Susan Fliss and Sue Gilroy Harvard Libraries	Four-Year Private	6,641	"One-off" training sessions in courses, special sessions at instructors' request, library workshops, and individual student consultations
Santa Rosa Junior College	Nancy Persons, Doyle Library	Community College	33,000	Required information fluency course (1 semester), "one-off" training sessions in courses, special sessions at instructors' request, and library workshops
University of Puget Sound	Jane Carlin, Collins Memorial Library	Four-Year Private	2,582	"One-off" training sessions in courses, special sessions at instructors' request, and freshmen tutorials
University of Texas at Austin	Michele Ostrow, Library	Four-Year Public	51,195	"One-off" training sessions in courses, special sessions at instructors' request, library workshops, and individual student consultations

In order to facilitate contact with recent graduates, we enlisted the help of research liaisons, alumni offices and foundations on each campus in our study. These liaisons had job titles such as library directors and information literacy specialists.

Liaisons were instrumental to our research efforts in three ways: (1) helping PIL obtain access to campus administrators for Internal Review Board (IRB) review and approval; (2) providing contact and ongoing liaising with campus alumni foundations; and (3) providing a setting for the focus group sessions that was separate from the library in order to avoid a "pro-library" bias.

For this study, we collaborated with each PIL research liaison and his or her alumni foundation office. We asked the alumni foundation to select a random email sample of undergraduates, who had received their degree between 2005 and 2011. Further, the foundation office branded and directly sent out our call for focus group participation.

⁴⁰ This sample number has increased to 185 institutions at the time of this report's publication. For a map of the complete PIL Volunteer Sample, see <http://tinyurl.com/3to4uvo>

Noticeably, the response rate to our call for focus group participation was extremely low: less than one percent in most cases. There are several plausible explanations for this. One is that the large majority of recent graduates who received our call for participation may not have checked their "post college" email.

There is also the likelihood that potential participants intentionally ignored or deleted the message thinking it involved some fund raising effort, since the foundation office sent it. It is also possible that some prospective participants may have had no interest in being involved with their former institution once they graduated.

Traditionally, focus groups have had eight to ten participants to encourage discussion and diversity of opinions. But our focus groups ranged in size from four to nine participants. We purposely intended to form smaller groups, a practice used when the researchers want to cover potentially complex topics in detail.

Appendix, Figure 4: Sampling Details for Focus Groups

	Date of Session	Location of Session	Emails Sent	Sample (n = participants)
Harvard College	May 19	Harvard campus	1669	9
Santa Rosa Junior College	April 21	Santa Rosa Junior College campus	3500	4
University of Puget Sound	May 5	University of Washington, Seattle campus	990	12 (5 + 7/ 2 groups)
University of Texas at Austin	April 28	University of Texas at Austin campus	3500	7

n = 33 participants

Methodological Issues

There are challenges associated with the use of interviews and focus groups as qualitative research techniques.⁴¹ Qualitative research, unlike quantitative, is not intended to produce generalizable findings about a sample. Rather, the goal of qualitative research is to deeply understand a specific situation within a natural setting and how interviewees regard the situation (i.e., solving information problems in the workplace).

The two qualitative methods we selected—interviews and focus groups—were intended to collect nuanced data about underlying situations, attitudes, and opinions. To enhance the reliability of our interview technique, we used a scripted interview with study participants in both samples.

⁴¹ We acknowledge the following papers for their review of the methodological issues with the interviewing vs. focus group techniques: Sashi Sharma, "Qualitative Methods in Statistics Education Research: Methodological Problems and Possible Solutions," *ICOTS8 Conference Paper*, International Association of Statistical Education (IASE) <http://www.stat.auckland.ac.nz/~iase/publications/icots8/ICOTS8_8F3_SHARMA.pdf> (accessed July 6, 2011); Janet Smithson, "Using and Analysing Focus Groups: Limitations and Possibilities," *International Journal of Social Research Methodology*, 2000, 3:2, 103 -119; and Eszter Hargittai, W. Russell Neuman, and Olivia Curry. "Taming the Information Tide: Perceptions of Information Overload in the American Home," *The Information Society: An International Journal*, 2012, 28:3, 161-173.

Specifically, we used focus groups in order to capture spontaneous discourse around a defined set of topics (i.e., preparedness and practices after college as information-seekers in the workplace and in life at large). A hallmark of focus groups is the discussion that develops in a socially constructed situation. In many ways, participants engage in performances to jointly produce accounts that provide opinions to the moderator.

No two focus groups produce the same results nor are they intended to do so. Rather, focus groups are useful for understanding unanticipated and collective responses useful when formulating hypotheses and developing survey instruments for use in later studies.

Given these methodological distinctions, we do not assume that our findings are representative of a larger population. We acknowledge the sample was limited in the number, nature, and range of participants. We recognize that voluntary participation always introduces a certain amount of inherent bias, as do group discussions, such as some of the interview questions used in our research design.

Moreover, we acknowledge that the efficacy of interview and focus group methodologies depends on respondents providing accurate and complete answers. Accordingly, the interviewer must endeavor to establish trust and rapport while keeping track of the responses.

Moderators of focus groups must be trained to curtail input from dominant individuals in sessions, so those who are more reticent have a turn to speak. Bias on both sides of this kind of exchange is a formidable issue. It can be inadvertently introduced in the way the researcher frames a certain question or in the way that a respondent interprets and then answers it.

To this end, we incorporated *methodological triangulation* into our study design. Social scientists have long argued that triangulation increases the validity and accuracy of results. Triangulation can be used as "an attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint."⁴² In our study, triangulation involved using two qualitative methods—employer interviews and the recent graduate focus groups—to cross-verify overarching trends we discovered about workplace information literacy. ❖

⁴² See Louis Cohen, Lawrence Manion, and Keith Morrison, *Research Methods in Education* (Oxon: Routledge, 2007) 254.

Acknowledgements

The idea for this study originated in 2009 during a conversation with Mike Eisenberg at the University of Washington's Information School. At the time, Mike and I were Co-Directors and Co-Principal Investigators of PIL. One day while reviewing a questionnaire that was to be administered to college students we began talking about what happens to college students the day after graduation. This conversation led to the idea of studying the information-seeking behavior of college students once they graduated and entered the workplace.

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