F I N D I N G   C O N T E X T :

What Today's College Students Say about Conducting Research in the Digital Age

BY ALISON J. HEAD, PH.D. AND MICHAEL B. EISENBERG, PH.D.

Abstract: A report of preliminary findings and analysis from student discussion groups held on 7 U.S. campuses in Fall 2008, as part of Project Information Literacy. Qualitative data from discussions with higher education students across the country suggest that conducting research is particularly challenging. Students' greatest challenges are related to their perceived inability to find desired materials. Students seek "contexts" as part of the research process. A preliminary typology of the research contexts is developed and introduced. Finding contexts for "backgrounding" topics and for figuring out how to traverse complex information landscapes may be the most difficult part of the research process. Our findings also suggest that students create effective methods for conducting research by using traditional methods, such as libraries, and self-taught, creative workarounds, such as "presearch" and Wikipedia, in different ways.

Introduction

What is it like to be a college student in the digital age?

In a world teeming with information technology and overflowing with access to data, how do students find the information they need? How do students conduct research for course-related assignments? How do they conduct research for use in their everyday lives? What frustrations and obstacles do they encounter? What strategies have students developed to meet their information needs?

Project Information Literacy (PIL) is a national research study based in the University of Washington's Information School. We seek to answer these questions by studying how college students function in the digital age—their tasks, their situations, their solutions, and their systems. [1, 2]

We want to learn how these "early adults" resolve issues of credibility, authority, relevance, and currency of resources used for course-related research and for what we call "everyday life research." At the same time, we ask what insights can be gleaned from studying students, through the lens of their own experiences, for improving the transfer, teaching, learning, and measurement of information literacy competencies.

During the fall semester of 2008, we conducted 11 discussion groups on 7 college and university campuses across the United States. We talked with 86 full-time students studying the humanities and social sciences and enrolled in private colleges and universities, public colleges and universities, and community colleges.[3] In our discussion groups we heard first-hand accounts about what conducting research means, what the stages of research entail, and what techniques, strategies, and solutions students apply throughout the process.

So far, we have found that no matter where students are enrolled, no matter what information resources they may have at their disposal, and no matter how much time they have, the abundance of information technology and the proliferation of digital information resources make conducting research uniquely paradoxical: **Research seems to be far more difficult to conduct in the digital age than it did in previous times.**

In this progress report we share some of the perceptions that led to this conclusion and several of the trends in problem-solving strategies that have emerged. The findings and analysis presented here should not be viewed as complete, but rather as part of our ongoing research that will be explored further and tested more rigorously.

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[1] The research for Year One of Project Information Literacy (PIL) is sponsored by a generous gift from ProQuest to the University of Washington's Information School for the further study of information literacy.

[2] PIL is co-directed by Dr. Alison J. Head, Affiliate Assistant Professor in the iSchool and Michael B. Eisenberg, Dean Emeritus and Professor in the iSchool. For an overview of the findings, see a short video (4:06 minutes) produced by the PIL Team at http://tinyurl.com/3fubgk and the PIL Web Site at http://projectinfolit.org. Communication about this progress report should be sent to Dr. Alison Head at ajhead1@u.washington.edu or Dr. Michael Eisenberg at mbe@u.washington.edu.

[3] We held 90-minute student discussion sessions with sophomores, juniors, and seniors at Harvard University, University of Illinois at Urbana-Champaign, Mills College, University of Washington, and with students, who had completed at least one semester, at three community colleges, including Diablo Valley College (CA), West Valley College (CA), and Shoreline Community College (WA), during October, November, and December 2008. For more about our methods and sampling procedures, see the Appendix of this report.

The Activity of Research

We define course-related research as those activities that commence upon receiving an assignment and continue through collecting research resources until the writing of the final paper. In our sessions, we found the signature course-related research assignment for the humanities and social sciences is the 5- to 7-page argument paper. Students are usually free to choose a topic as long as it is related to the course curriculum and has "evidence," culled from scholarly or other reputable sources that back up a position, an opinion, or an argument.

Student paper topics widely varied. Among the topics students researched and wrote about were the Algerian War, Macs vs. PCs, Puerto Ricans' immigration to Philadelphia, Post-Soviet economics, disability rights activism, theories of intersectionality, *Jane Eyre* and feminism, multiple intelligence theories, animal-assisted psychotherapies, and alternative Indian religions.

Another type of research students frequently conduct we call "everyday life research." We define everyday life research as the ongoing information seeking strategies for solving problems that may arise in daily life (e.g., health and wellness, finance and commerce, news, politics, and/or policy).

Most topics of everyday life research discussed by students in the sessions dealt with five themes: (1) Health and wellness (e.g., Lyme disease from a recent tick bite, a relative just diagnosed with cancer); (2) news (e.g., checking a hometown paper online, finding out how to cast an absentee ballot, following the Obama-McCain race); (3) domestic (e.g., finding out about which neighborhood to move to next summer, how to get trash collection for my group house, figure out why my computer is "freaking out"); (4) career (e.g., are jobs available with this major, what salary do people in this profession earn); and (5) spiritual (e.g., finding out about a religious group and what values it holds).

We found that everyday life research is different from course-related research in four significant ways:

1. Everyday life research was defined as personal and having no deadline set by someone else, unlike course-related research. The most frequently reported first step for everyday life research was Google. Next, students used a blog with which they were already familiar, or Wikipedia. Academic libraries, professors, and course texts were not used as sources in any of the examples we heard.

2. Everyday life research was often an open-ended search for information. Students reported that searches for everyday life information could last for days, and were driven by curiosity, as students clicked on Google results or Wikipedia citations and unfolded layers of information.

3. Personal curiosity was more easily satisfied in searches for everyday life research, even if participants turned up answers that were admittedly not as conclusive and accurate as they might have been. Clearly, course-related research did not afford participants the same luxury. Readers and graders of research papers were not so easily satisfied and the cost of error demanded more rigor and accountability from students.

4. Participants in our sessions reported almost twice as many frustrations, overall, with conducting course-related research than with everyday life research, though the nature or type of participants' frustrations had underlying similarities. Nine out of 15 (60%) of the frustrations students reported for course-related research had to do with an inability with finding the desired materials. Similarly, 5 out of 8 (63%) of the frustrations participants reported involved locating research materials.

Frustrations and Challenges

Our data suggest that conducting research, whether for course assignments or everyday life problems, comes with its own set of challenges that are usually exacerbated in digital environments. Challenges are often deep-seated frustrations tied to finding resources students know exist, somehow, somewhere, but are unable to access. (See Figure 1, "What Frustrates Students When They Conduct Research?")

FIGURE 1: What Frustrates Students When They Conduct Research?

Course-Related Research	Everyday Life Research
• Information overload (e.g., the more you know, the less you know, it's depressing).	• Too many results from a Google search and the need to sort through them.
• Too much irrelevant information, can't locate what is needed from online results.	• Knowing the "answer" is online, but not being able to find it.
• Beginning and getting started on an assignment.	• Figuring out what is a credible source, and what is not.
• Trying to find the "perfect source."	• Figuring out if something is up to date.
• Not knowing what to look for, yet still sifting through articles that might fit.	• Knowing that everything is not online, especially when searching the Web.
• Trouble finding books needed on library shelves.	• Never can find enough information on the obscure topic being searched.
• Can find the citation online, but cannot find the full-text article in a database.	• Once a great source is found online, how is it found again when it is needed?
• Scholarly databases or library books are out-of-date.	• Don't have a computer at home, so online searches for information involves some travel.
• Finding statistical information online.	
• Having to change and refine how to write a research paper from class to class.	
• Not having access to same materials as professors (e.g., rare documents).	
• Having to buy a source unavailable on campus	
• Trying to find the .05% of things of interest not on Web.	
• Feeling that nothing new is being said and feels like the same information again and again.	
• Conducting research to meet another's expectations.	

List runs from most to least frequently mentioned frustrations by students, n = 86

The Need for Context

For many students conducting research may feel a lot like being an inexperienced sailor heading directly into an oncoming wind, sails wildly flapping, and not being able to maneuver and get to a desired destination.

But why is this so? What did we find from students through the retelling of their experiences that helps to more deeply explain why the research process is so complicated for undergraduates?

In a word, "context."

Context, as we came to understand it in the sessions, is a key to understanding how students operationalize and prioritize their course-related and everyday life research activities. In our discussions, students consistently referred to "finding context," in one form or another, as the most laborious, yet requisite, part of the research process.

In particular we found that:

1. Students usually needed to obtain several different kinds of context for course-related research.

2. Students seek different kinds of context with varying degrees of efforts or engagement, depending on whether the research was academic or everyday life research and what interest the topic held for them.

3. Students have developed strategies, techniques, and workarounds through trial and error and designed their own methods that sometimes, but not always, help them find context.

A Typology of Contexts

As an outgrowth of the sessions across campuses, we have come up with a preliminary typology that represents research contexts, which students need at various times, and in varying degrees.
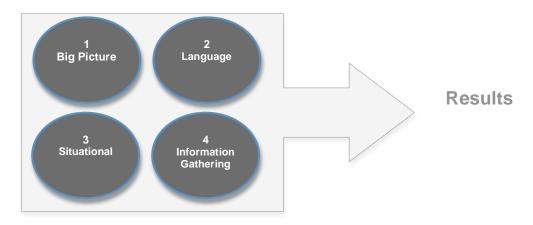
Our typology is meant to provide: (1) a deeper understanding of the difficulties of the research process for early adults, as viewed through the lens of the student experience; and (2) a backdrop for our discussion of what we have learned so far about how students develop strategies for succeeding. We intend to refine and modify our typology with more data, as our research activities continue.

We have identified four types of context that students reported they tried to obtain during the research process. In order to undertake research, students may seek (to varying degrees) the following contexts:

1. **Big picture**
2. **Language**
3. **Situational**
4. **Information Gathering**

Figure 2 presents a graphical representation of the contextual foundations students require. Students require a need for each context in different degrees of intensity, depending on whether students are conducting course-related or everyday life research and their level of engagement, given the research task.

FIGURE 2: A Preliminary Model of the Undergraduate Research Process

Each category of contextual foundation is discussed in detail.

1. Big picture context involves selecting and defining a topic, understanding multiple sides of an argument, figuring out how the topic might best fit into the course curriculum—all exercises in critical thinking, a significant learning outcome of the higher education experience.

In our sessions, participants working on course-related research reported a much stronger need for big picture context than they did for everyday life research. Even though students had the freedom to write on topics of their own choosing, the ability to choose a topic, itself, could be daunting. Many students reported that they often had little or no idea how to choose, define, and limit the scope of a topic.

One student related the following account:

> "In my philosophy class there was a research paper about Socrates and his whole ideals and the professor asked us to write something that we can relate to present-day history and what would happen back in Socrates' time. Most of the students in my class were international students and I don't know if they go over that in their native countries, like old Roman history, so it was hard in that aspect, a lot of people just didn't understand what we were supposed to write about, and Socrates really wasn't covered in class too much. It was too broad of a research assignment to the point of where if I picked anything, sure, I could write about it, but I wouldn't know if that was the right thing to write about, or the wrong thing, I just didn't know where to begin."

For students in our sessions, like this one, an early step in the research process was synthesizing and delineating a topic, and figuring out how it might best fit into the course curriculum. In their own words, students in our sessions described their need for a big picture context in terms of "thinking about a topic in a different way," and "narrowing down a topic area that can seem too broad," and "finding the common knowledge about a topic area, that is going to reoccur over and over again."

Only then, students said, could they get some traction with an assignment, expand their knowledge of it, and search for other resources, usually scholarly ones, as needed. One student summed up his need for background context, by saying "The longest part of research is getting to the question to ask."

The Waiting Game

In our sessions, some students said they delayed starting their search for sources until after they had taken a week or so, to think through an assignment. Often this reflective phase was related to obtaining the big picture context a student needs in order to begin research activities. One participant called this her "stew mode," a phase at the beginning of the research process that involved thinking about the assignment, letting it "percolate."

Another student said she needed to go out into the world and see if she could come up with ideas for her paper. She said, "maybe I'll see something when I'm riding the bus, a billboard, a newspaper, a book someone is reading and it gives me an idea and then I jot down a few notes in my iPod's to do list." Other students mentioned they would comb through one of their course texts, looking for ideas for their research paper.[4]

Truth be told, however, the majority of students we interviewed did not start on an assignment—thinking about it, researching, or writing—until two or three days before it was due.

Most of the students we interviewed—8 out of 10—were self-described procrastinators. There was a strong consensus among students that they waited until course-related research assignments were nearly due to begin or to really expend time and effort on an assignment. That is, a large majority of students reported spending three hours on research and another two hours on writing—one or two days before a 5-7 page course-related research paper was due.

In rare cases, some students would "dive into an assignment" as soon as they received it, but only if the topic really intrigued them. Overall, though, we found more than 80% of students interviewed procrastinated on more than 80% of their course-related research assignments.

The tendency to procrastinate occurred most frequently among students enrolled at research institutions. In these settings, students have online access to large library collections and multiple libraries on their campuses, where they were "sure to find something to cite"—even at the last minute. Students would start a research project by inputting a few search terms in the search engine of a database that had brought them "luck" on a previous assignment (e.g., JSTOR, ProQuest, or EBSCO).

However, the story was a little different at smaller institutions with limited library collections. In these settings, participants told us they would begin working on a course-related research assignment several weeks in advance. They would need to search scholarly databases (e.g., ProQuest), find a few articles they could review, and then order them, if need be, to read later. In other cases, some students would begin by ordering books through library interlibrary loan services.

Students procrastinated sometimes as a source of motivation to get them working; sometimes as byproduct of frustration with not easily finding the resources they wanted. One student at a research institution had a formula for applying to course-related research assignments: "Decreasing time equals increasing motivation." Another participant added, "I have to be under pressure to get motivated, since I'm constantly juggling so many things at once."

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[4] In our 2007 study about how humanities and social science majors conducted research at Saint Mary's College of California, we found that the largest percentage of students (40%) in our sample at the small, private liberal arts institution reported that they started the research process by consulting a course textbook or other assigned class readings. See "Information Literacy from the Trenches: How Do Humanities and Social Science Majors Conduct Academic Research?" Preprint publication by Alison J. Head, *College and Research Libraries*, September 2008, vol. 69, no. 4, http://tinyurl.com/akpqpe, (39 pages).

On another campus, a student explained her need to mobilize and leverage a high level of what she dubbed, "functional anxiety."

She related the following account:

> "Procrastination, for me, is about the adrenaline rush. I'll write a response paper in less than an hour before it is due. It's always just like a race. Can I find some quotes pull them out and put them together? Oh, look, I need to get this done in 20 minutes and turn it in. And once you know you can do it and get a good grade, you do it, especially if you can get away with it."

Even though participants admitted having a tendency to procrastinate, they also told us when they conducted course research they were often frustrated "by always feeling too rushed."

At one point in the sessions, we asked participants "What one word sums up how you feel at the moment you receive a course-related research assignment?" It came as no surprise to hear them say: *angst, tired, dread, fear, anxious, annoyed, stressed, disgusted, intrigued, excited, confused, and overwhelmed.*

2. Language context involves becoming more comfortable with the language, terms, and discourse of a topic area. Obtaining the meaning and use of language is an essential context in the research process for either course-related or everyday life research. Without a context for the vocabulary and terminology of a topic—what things are called and what they mean—students could not proceed with any confidence and reported that they usually did so with little success.

In our sessions, we found that students needed far more language particulars for conducting course-related research than they did for everyday life research, especially when it came to formulating search terms.

One participant reported the following experience:

> "I wanted to write about how using animals can help people. But I needed different terms, other terms to use when I was searching and trying to look up other things on other sites. I found there's, like, dolphin-assisted therapies, horse therapies, and then there's psychotherapies…I guess they're all different themes, I guess that's what they are, and then I found out I needed animal-assisted therapy, that's what it's called, that's what I found out I needed."

Some students in our sessions, who were majoring in the humanities, especially a language, expressed their own frustrations with obtaining the language context for translating terms in one language to another one. Still other students reported that a limited understanding of the technical jargon found in their initial searches, usually in scholarly journals, hampered their progress. Students who did not know enough about the terminology of a field lacked the language context to make discerning decisions in their searches for information.

3. Situational context involves setting the parameters of a topic, especially how efforts may fit into expectations and a set of surrounding circumstances. For everyday life research, students in our sessions defined the need for situational context in terms of their own need to know for personal gratification, curiosity, and/or the pressing need of the query (e.g., a health-related concern).

Course-related research, however, involved meeting the expectations of someone else, usually an instructor, who was assigning a grade and was therefore far more difficult to define. Students told us they usually had some need for situational context about research assignments, especially "figuring out what a professor wants," "meeting a professor's expectations and getting a good grade" and "figure out how far to go with something."

One participant enrolled in a large research institution explained:

> *"Professors are the 'source' they are the experts about the topic and about the assignment, but they are so hard to get a hold of, it's not like a professor is going to pass out their 'buddy list' to 600 students sitting in a large lecture…I swear professors skipped right from high school to being a professor and they have no idea where we are going and what we need to do for papers so that we can get a passing grade, but they are the ones giving out the assignment."*

At smaller, more teaching-focused institutions, participants tended to view professors (and librarians) as forthcoming and helpful in providing them with the situational context that they needed to work on course-related research assignments. At larger research-focused institutions, the story was different. In general, these students reported they had less contact with professors as research coaches than did students at teaching institutions and they struggled with finding the situational context for an assignment.

In some cases, the kinds of primary research method professors used at research institutions did not help students learn the nuts and bolts of secondary research they needed. One student said, "if a professor shows something in class they dug up from the ground in Scandinavia last summer, sure, that's may be research to him, but it's not the kind of research I need to do."

4. Information-gathering context involves finding, accessing, and securing relevant research resources that "satisfice" individual research needs. In our sessions, students described information- gathering context in terms of a "hunt" for information. We found finding information sources for everyday life research or researching personal topics tended to be far less rigorous than deadline-driven course-related research in the academy.

Participants discussed how "interfacing between the library and the Internet" was difficult for course-related research and "trying to find what I found online also in the library, hoping it's not lost, overdue, or shelved in the wrong place."

One student in a session described her hunt for information:

> *"I spend so much more time on researching, just trying to find information than I ever do on writing the paper. I seem to spend the most time coming to the library, trying to find out where the hell the article I need is, getting it, copying it. We're supposed to have a link to the article right on the Web Site, but we actually don't because they haven't updated the site so now I have to go and try to find the article in the main stacks, physically, and it takes so much of my time, it's so confusing."*

For such participants, we would say that findability was often the most intimidating part of course-related research. We apply Peter Morville's definition of findability as "the quality of being locatable or navigable, the degree to which a particular object is easy to discover or locate, and the degree to which a system or environment supports navigation and retrieval."[5] Overall, students in the sessions said they were "overwhelmed by all the choices," "lacked a necessary orientation to find things," and, in general, "always have trouble finding what I am looking for" (both online and in the library).

Strategies, Techniques, and Workarounds

So far, our research has found that course-related or everyday life research for early adults is replete with its own frustration and challenges, many of which involve finding certain contexts for carrying out research tasks. At the same time, we found that students are not without their own strategies and workarounds for resolving the difficulties they face with obtaining certain kinds of contexts. One solution is found in libraries, the other through a self-taught, online method.

Use of Libraries

In light of the context typology, students value libraries for giving them the *information-gathering context* that they need to carry out course-related research. We found students valued libraries, and librarians, especially in assisting them with their strategies for retrieving "citable stuff" and for helping them navigate complex information spaces, especially on larger campuses.

Participants in our sessions reported they valued libraries (i.e., library resources and librarians) for the following reasons:

1. For the online library start page, which they used, usually off-site, as gateway to scholarly research databases.

2. For librarians as "navigational sources," which they used most often used for making sense out of the complex library system on campus.

3. For librarians as "information coaches," who they used for refining thesis statements or helping them locate hard-to-find resources (i.e., statistics or government documents).

Students, who used libraries, looked to them, and especially to the reference librarians they consulted as sense-makers. Librarians helped students *satisfice* their individual, often time sensitive, information needs.[6] One student said, "librarians on this campus can be saviors, you need them to show you how to navigate a complex library system."

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[5] See Peter Morville's, *Ambient Findability: What We Find Changes Who We Become.* Sebastopol, CA: O'Reilly Media, 2005. Morville, who first defined the concept of "findability," is also, thankfully, on the Advisory Board of Project Information Literacy.

[6] Herbert Simon, the Nobel-winning psychologist at Carnegie Mellon University, first coined the term, "satisfice" to describe a type of decision-making that is a hybrid of satisfying and sufficing (1957). We apply satisfice here as it applies to students making a choice that suffices to fulfill the minimum requirements to achieve an objective (i.e., finish conducting research about a topic), without special regard for utility maximization or optimization of one's preferences.

A student in a session recalled her first few weeks, saying:

> "My first semester here I was very daunted by the library system. It's a very daunting library system, there are so many separate libraries on this campus, there are millions of books. It makes no sense. And then someone said to me, "Oh yeah, what's the LC?" And I said, "What's an LC"? Then it hit me that must mean the Library of Congress where they have all these abbreviations that they throw around. It wasn't until my Human Rights Seminar, when a group of four of us organized a library research seminar, one hour with a research librarian, who went through all possible things you can do to find credible sources, which databases you can look up, then I was able to go out and get my hands dirty with research...it helped immensely."

Many participants considered formal library instruction (one-time, individual class visits) of little value to them, too. Throughout our sessions, participants reported that "library talks" (i.e., bibliographic instruction) made sense at the time, but that it was hard to recall and apply months later, when students were working on a research assignment.

Other participants reported that they infrequently consulted librarians with the search terms they entered into scholarly research databases. Students told us "we are just as capable to enter basic search terms as librarians can," "that I've been able to get by, so far, without librarians," and "I don't need a tour of the library, I just need to find one thing...now." One student said, "my first step used to be the library, but it was too much information, now I just go to the Web."

We found, generally, that when students did not receive (or request) the service they value delivered at the moment they need it from librarians, they quickly change course. Participants found a solution on their own, which is usually found online and derived from self-taught techniques that help them find the context they need.

Use of Wikipedia

We found Wikipedia was a unique and indispensible research source for students. The online, collaborative, community-based online encyclopedia gave students a workaround for obtaining the *big picture* and *language contexts* they frequently lacked for course-related and to a lesser degree, everyday life research. In nearly three-quarters of the student discussions—8 out of 11 sessions—there was a strong consensus among students that their research process began with Wikipedia.

Wikipedia? Yes, Wikipedia.

Students described Wikipedia as their "first go-to place" because Wikipedia entries offer a "preview" and provide "a simple narrative that gives you a grasp" and "can point you in the right direction," and "helps when I have no idea what to do for a research paper."

A student related the following account:

> "I go to Wikipedia just so to get an understanding of a topic. Like, I did a paper on Puerto Ricans in Philadelphia and I went to Wikipedia first just to check it out. I looked at the history of Puerto Rico and then, Puerto Ricans in the United States. Just to get a basic understanding, so that, I could say to myself, okay, I know the beginning now, I know the current situation, I'm okay, and now I've got some citations and stuff, I've got a stepping stone to get deeper into the issue I've chosen."

Students who used Wikipedia were precise in characterizing the online and collaborative encyclopedia as "a .5 step in my research process" or "the very beginning of the very beginning for me." As one student summed it up, "Wikipedia is my presearch tool." In other words, Wikipedia was used for pre-researching a topic and preceded what students described as "serious research," which involved searching scholarly databases, such as ProQuest, JSTOR, or EBSCO.[7]

Students who used scholarly databases after a Wikipedia search said that they avoided starting with scholarly databases first because it was "too much too soon." Overall, students reported that scholarly articles had "too much technical jargon before I understand what I am writing about" and "were often not up to date as Wikipedia." Before talking to a professor, students admitted, too, they needed background about a topic. (See Figure 3, "Why Do Students Use Wikipedia?")

FIGURE 3: Why Do Students Use Wikipedia?

1. Provides background and brief overview; helps where scholarly journals can be too specific or narrow as a beginning step in the research process.

2. Identifies and defines search terms that students can use when they search scholarly research databases next.

3. List citations at the bottom that serve as a jumping-off point for using scholarly research databases.

4. Often includes timelines and charts that help with visual learning.

5. Uses "good English" that is written by "real people" and that is easily understood (e.g., Wikipedia has content written in a style with "no fluff").

6. Provides current, up-to-date information (e.g., "everything is there, even 'Joe the Plumber' is in there").

7. Interface is usable (e.g., links are highlighted, entries are short, and "above the fold" information is prioritized).

8. Builds confidence and helps students start to get the work done (e.g., "if Wikipedia can summarize something that seems so broad and huge to me, then I know I can do it to for my assignment").

9. Shows another network of research sources that exist (e.g., "I was working on a paper about the Seven Wonders of the Ancient World, I had my list of resources that I could compare with the citations on Wikipedia to see someone there came up with").

10. Open-sourced functionality allows for updates and changes that can increase the authority and accuracy of information.

(n = 86)

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[7] As a point of interest, none of the participants brought up use of one of Gale's subject encyclopedias for "backgrounding" a topic. In one session, an English major said she went to SparkNotes to get background for a research assignment, another student responded to her, "But SparkNotes doesn't have everything, like Wikipedia does." There was a consensus in our sessions that Wikipedia rarely disappoints. One student said, "Wikipedia even has Joe the Plumber listed, I've checked."

Participants told us they were fully aware of the controversy over using Wikipedia, especially for college-level research and assignments. Some students openly called their Wikipedia use "naughty," admitting they were "embarrassed to say" but they frequently used the site. Another student said, "Wikipedia? It's a great place to start, and a horrible place to end, at least that's what my professor says."

While some students mentioned the penalties for using Wikipedia for course-related research assignments (e.g., ranging from public humiliation in class to receiving a failing grade), we found the majority of students ignored the negatives and went to the site anyway. Most students depended on and used Wikipedia for information cited in papers, but just never included Wikipedia entries on their *Works Cited* page.

In our sessions, students also discussed concerns over Wikipedia and accuracy. However, most participants believed that they, themselves, had the ability to discern the credibility of a Wikipedia source, based on their "gut level" interpretation of Wikipedia's rating system (e.g., posted notes by editors such as, "This article needs additional citations for verification").

The relationship between the transparency of Wikipedia's open source knowledge production methods and students' concerns about credibility is an area we hope to explore further in our research.[8]

Overall, as far as the students in our sessions were concerned, the advantages of using Wikipedia definitely outweighed its perceived drawbacks. While Wikipedia may do little to help students figure out the situational context for an assignment, Wikipedia is a "one stop shop" for providing, some, not all students, every time, with the *big picture context* and *language context* they need to make sense out of an assignment and move onto what they described as serious research, or searching for scholarly materials, usually online.

Implications

Our findings offer some rich and intriguing insights into the behavior and motivations of early adults and the ways in which they seek information in the digital age—in their own words, through the retelling of their own experiences.

In general, students reported being challenged, confused, and frustrated by the research process, despite the convenience, relative ease, or ubiquity of the Internet. In our sessions, frustrations included the effects of information overload and being inundated with resources, but more. Participants also reported having particular difficulty traversing a vast and ever-changing information landscape. Specifically, participants greatest challenges were related to finding the materials they desired, knew existed, and needed on a "just in time" basis.

Overall, we conclude that students are challenged and often inexperienced with "finding context"—a requisite for conducting course-related research and to a lesser extent, everyday life research. We have developed a preliminary typology of contexts to describe the kinds of backgrounds college students may need when they conceptualize and operationalize the research process, especially in the early stages, whether they are at large research institutions or teaching colleges.

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[8] For a further discussion, see Simson L. Garfinkle's, "Wikipedia and the Meaning of Truth: Why the online encyclopedia's epistemology should worry those who care about traditional notions of accuracy," *MIT Technology Review*, November/December 2008. The author argues that Wikipedia's standard of truth is consensus and that their standard for verifiability is "really an appeal to authority—not the authority of truth, but the authority of other publications."

Our hope is that our typology, as we refine it with further research, will offer an inside view of the student research process, help identify its "pain points," and have some benefit to those involved in transferring and teaching information literacy competencies to students. Our goal in our future work is to make some recommendations to faculty and librarians.

We believe a deeper understanding of how students conceptualize research processes may be the basis for identifying and narrowing gaps between types of research practiced by students compared to those used by faculty. In particular, we hope to make recommendations for how faculty can provide students with a greater understanding of a topic's *big picture context* as well as providing more details about the *situational context* of an assignment.

For librarians, a further understanding of what kinds of contexts students seek during different times of the research process may help librarians with their ongoing efforts to make bibliographic instruction more "student-centered" and contextual, based on students' needs at given times. At the conclusion of our full research study, we hope to recommend more ways librarians can supply the *information-gathering context* students report they need when they conduct research.

Next Steps

In Spring 2009, we plan to test our preliminary typology further with a larger sample and a student survey administered on three campuses, enrolled in similar institutions (i.e., community colleges, public colleges and universities, and private colleges and universities). In particular, in the next phase of our work, we will explore our findings, in the hope to:

1. Collect quantitative data about the student research process to obtain a more systematic and formal understanding of the existence of research contexts and test our typology further. With a goal of finding out more about the "early adult" research process, including when the needs for different context arises, under what conditions and in what order, if one applies, and how students obtain contexts for satisfying their information needs through pedagogical methods, and self-taught workarounds, such as Wikipedia.

2. Understand how and why the design of online resources used by campus libraries and produced by database vendors, enhances or detracts from early adults' research experiences. With a goal of finding out when certain resources work best for helping students find the contexts they need for carrying out research.

3. Make recommendations, based on quantitative and qualitative data, for how faculty, librarians, and others involved in transferring, teaching, information literacy competencies to early adults, may be able to have a deeper understanding of what happens on the student side of the research process equation.

Appendix

Research Methods and Sampling

The Project Information Literacy Team conducted eleven 90-minute student discussion group sessions on 7 campuses in the U.S. between October and December 2008. Co-Principal Investigator Dr. Alison Head led the discussions with students. Project Information Literacy Team Member Sarah Vital, a reference librarian at Saint Mary's College of California, who worked on the 2007 study of students on that campus with Dr. Head, served as research associate and an observer at the majority of the sessions.

In total, there was a collective sample of 86 full-time sophomores, juniors, and seniors, who were studying humanities and social sciences and enrolled at public universities and private colleges and universities and at community colleges. Our sample was comprised of students who had completed more than one semester and had completed most of the prerequisites in the humanities and social sciences.

In order to facilitate data collection activities on each campus, we enlisted the help of a "research liaison" (i.e., the instruction librarian or library dean at each institution). Among the various types of schools, we selected campus sites based on their "best fit" for our sample (i.e., an institution's enrollment, an institution's resources dedicated to information literacy training modules, its library collection size, its geographic location, and whether it can be categorized as a teaching or research institution).

We also asked research liaisons (to the best of their knowledge and acknowledging "self-reporting") to rank the information literacy competencies levels of the undergraduates they served on their campus. We used a 1-to-5- scale (1 being a low level of information literacy competency and 5 being a high level of information literacy competency) that is not reported here for privacy reasons. Our sampling criteria for selected institutions were also based on choosing schools that represented what our data reflected as both ends of the information literate competency scale. The table on the next page shows baseline information about each institution where data were collected.

Appendix, Figure 1: Institutions in the Fall Discussion Group Sample

Institution	Research Liaison	Date of Session(s)	Sample Size (n = 86)	Enrollment of Full-Time Undergrads
Harvard University, Cambridge, MA (Private University)	Susan Gilroy, Head of Reference, Lamont Library	Tuesday, October 28, 2008	14	6,000
University of Illinois at Urbana-Champaign, IL (Public University)	Lisa Janicke Hinchliffe, Coordinator of Information Literacy Services	Thursday, November 6, 2008	18	30,895
Mills College Oakland, CA (Private college)	Carol Jarvis, Associate Library Director	Monday, November 10	14	973
Diablo Valley Community College Pleasant Hill, CA (Community College)	Andy Kivel, Library Department Chair	Friday, November 14	11	16,000
University of Washington Seattle, WA (Public University)	Deb Raftus, Romance Languages and Literatures Librarian	Tuesday, November 18	15	28,843
West Valley Community College Saratoga, CA (Community College)	Maryanne Mills, Library Department Chair	Thursday, November 20	7	3,378
Shoreline Community College Shoreline, WA (Community College)	Claire Lev Murata, Information Literacy Librarian	Tuesday, December 2	7	9,898

Student Sample

At four-year institutions, we recruited a voluntary sample of full-time undergraduates (sophomores, juniors, and seniors), who had taken a majority of their coursework in the humanities and/or social science disciplines. At two-year community colleges we conducted sessions with a voluntary sample of full-time students, who had completed more than 15 units and had taken more than four or five courses in humanities or social sciences.

We intentionally excluded any college freshman or first-year students from our sample. First-year students were more likely to discuss research strategies they had used in high school, instead of those they had developed (or were learning to develop) and had used, so far, in college. We also excluded those students majoring in the science our sample, for the most part,

who use labs for experiments and research assignments. Our intention was to talk to students most likely to use libraries, as a "lab," for their research assignments. Admittedly, we acknowledge that self-report is always an unavoidable issue with discussion groups, such as the one used in our research design.

The PIL team worked closely with the research liaisons to organize and recruit the student sample. We used several methods to recruit participants for the discussion group, including: (1) research liaisons' contact with students; (2) PIL flyers posted in classrooms, dormitories, and on hallway bulletin boards (i.e., not just in the library) with a call for discussion group participation; (3) a "refer a friend" incentive offered to students who had already signed up; (4) faculty contacts with students announcements in class or an email; and (5) a brief announcement online on the campus news site. In exchange for their time, student participants were given a $15 iTunes card. The vast majority of our participants were recruited through library or faculty contact. Students wishing to participate were directed to an online form for study participation on the PIL Web Site and were contacted, if selected, by the PIL Team to schedule a session.

The mean GPA for the total student sample across all 7 schools was 3.44, or just above a B+. There was representation from students studying anthropology, art history, communication, economics, education, English, gender studies, global studies, health, history, international relations, languages, linguistics, music, political science, psychology, social studies, and sociology. To a much lesser degree (9% of the sample), some student "walk ins" in our sessions were studying computer science, nursing, engineering, and business administration.

Far more females (70%) than males participated in the sessions. However, we did not intentionally try to balance our sample for gender (one of the institutions in the campus sample, Mills College is a women's college). Without Mills in the sample, more than half of the sample from co-ed campuses was female (63%).

The sample was limited in the number, nature, and range of participants who volunteered to participate. In some cases, our research liaisons contacted students who had jobs in the library. We made a concerted effort not to recruit a sample in which library student workers were disproportionately represented, since it was believed the student workers could introduce bias about using the library into the discussions. We found, however, that the opposite was true. Students who were library workers were often good "foils" for getting other students in the sessions, who had little or no awareness of library services, to share their thoughts and experiences.

Purpose of Discussion Groups, Use of Data

The purpose of conducting the student discussion groups was to collect qualitative data about early adults' research habits, behaviors, experiences, and the obstacles they encounter. Qualitative data from the discussion groups will be used to inform the student survey instrument and its response categories, which we will administer in Spring 2009 on three campuses (i.e., a community college, public college or university, and private college or university).

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

More specifically the trajectory of our overall research study seeks to answer the following research questions:

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

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

   1.2 What kind of barriers and obstacles exist for early adults that keep them from
   taking the first steps in both the course-related and everyday research?

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

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

   2.2 How do early adults engage in collaborative information problem solving with
   one another about conducting course-related and everyday research?

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

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

   2.5 How do early adults strategies for conducting course-related research vary from
   everyday life information problems?

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

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

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

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

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

4. How (and by how much) different types of institutions impact the information-seeking
   strategies of their early adults.

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

- End of Report -