Evidence to Scholarship (E2S):
Understanding the Research Needs of Reed College Students
Needs Assessment Report, September 2014

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The Evidence to Scholarship (E2S) project goal is to build a bridge from first-year introductory courses to the competencies students will need to conduct senior-level thesis research in their disciplines. During spring 2014, a needs assessment was conducted in order to identify services, resources and curriculum strategies to help sophomores and juniors develop independent research skills. The needs assessment explored both faculty expectations and student strategies, in order to understand the gap between faculty and student perspectives on the research process. The study was conducted in two sequential phases: focus group discussions with students and faculty, followed by a survey of sophomores and juniors. The needs assessment findings are summarized in this report, while detailed information on the research methods and results is available on the E2S project website (reed.edu/e2s).

Major Findings

Faculty characterize research as a complex process with many facets that students must ultimately integrate into a unified research assignment. In working on research assignments, faculty expect students to:

- Understand the disciplinary context
- Ask researchable questions
- Integrate scholarly resources and data to support an argument
- Learn discipline-specific methods
- Understand research as a conversation among scholars

Faculty expressed numerous challenges as they work to cultivate student research skills:

- Time constraints in and outside of class
- Balancing instruction of content and methods
- Widely varying student experience in mid-level courses
- Students use inefficient strategies to locate and organize sources and data

Across disciplines, faculty emphasized the importance of a good research question to guide the process. When asked what they think faculty expect, students ranked the research question as moderately important.

Many students aren't sure what is expected in a research assignment. They find it challenging to have enough time for the assignment, and to know if they've done a good job. Students find sorting through results and reading all their sources to be challenging, but they report relatively few challenges with the mechanics of searching and citing sources. Faculty, on the other hand, identified numerous problems students had with locating appropriate and relevant sources for their assignments.

Students would like services and resources that help them choose a realistic topic and better understand the components of a successful research assignment. They are more likely to use services that are integrated into their courses. Several recommendations for curriculum strategies, services, and resources emerged from the needs assessment:

Curriculum strategies

- Start working with sources earlier in the curriculum
- Focus on how to define a research question
- Break assignments into manageable parts
- Clarify expectations
- Integrate discipline-specific research methods
- Replicate successful strategies from other classes

Services and resources

- Training and services integrated into classes
- Technology tools for working with data and texts
- Templates and rubrics
- More full text, optimized for mobile devices
- Greater awareness of available support services
- More opportunities to learn from each other (people like focus groups!)

Full Report

Introduction

E2S seeks to support mid-level students as they make the transition from the first-year experience and work to gain the skills they'll need to succeed as independent scholars. In this context, research competencies are broadly conceived, starting with the basic aspects of finding and using information. Additional research skills include incorporating information sources in addition to texts, such as media and data, and using various technologies effectively to enable collaboration, analysis, visualization, and presentation.

The body of research from Project Information Literacy (projectinfolit.org) shows that students often struggle with the conceptual aspects of finding context and framing a research question. While an abundance of information literacy programs have focused on the mechanics of mastering complicated systems to locate resources, many students are struggling even to get started. The explosion of information resources available to students has actually made this problem worse. Add to that a wide array of technology devices, apps, and cloud services, and the challenges compound exponentially.

Faculty perspectives are critical to the student research process. Faculty set expectations for student success, and their recommendations for resources and strategies carry a lot of weight. Students are pragmatic about how technology will help them achieve their academic goals and they are interested in guidance from instructors on what is useful (see 2013 ECAR student study).

The ultimate purpose of this needs assessment, then, is to understand the gap between faculty and student perspectives on the research process. The insights gained from this analysis will enable CIS and the library, working in partnership with faculty, to identify strategies for supporting all facets of student research at Reed.

Research Questions

The following research questions guided the needs assessment:

- How do undergraduates learn to do research?
- What do faculty expect?
- What is challenging for students?
- What services and resources would help?

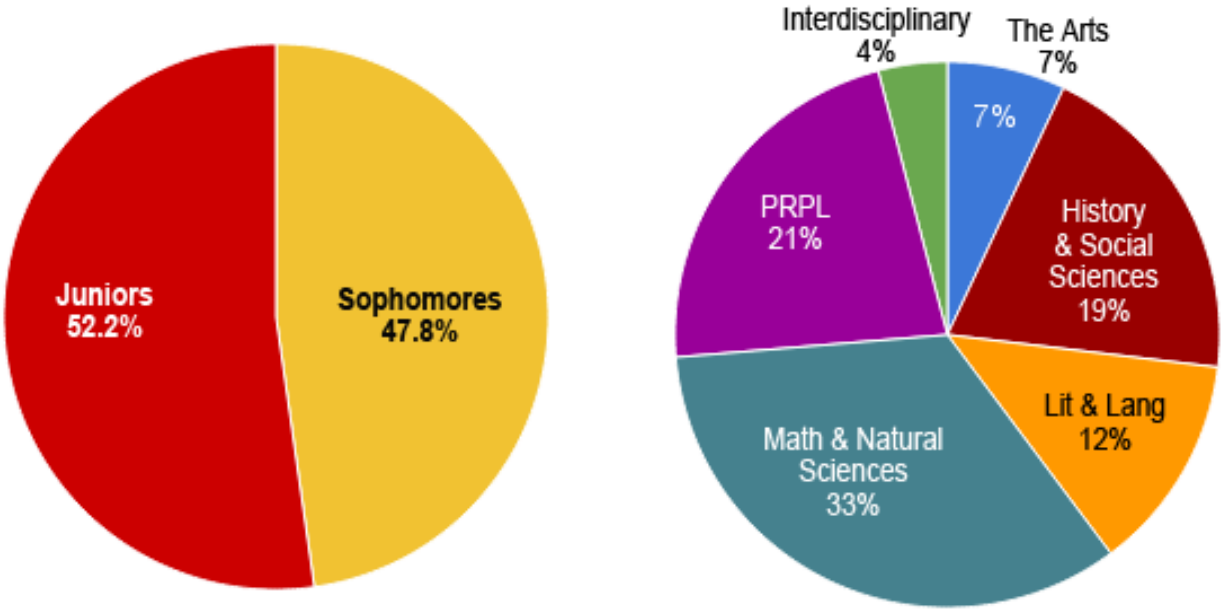
Methods

The needs assessment was completed in two phases:

- Phase I - Focus Groups
    - 3 faculty groups with 19 participants from 14 disciplines

- 3 student groups with 17 sophomores & juniors from 14 disciplines

- Phase 2 - Student Survey
  - Survey based on information gathered in faculty and student focus groups
  - 178 out of 657 sophomores and juniors responded (27%)



Student Survey Respondents

More information on the needs assessment focus groups and survey are available on the E2S project website (www.reed.edu/e2s/needs-assessment-methods.html).

Summary of Results

Faculty Perspectives

Across diverse disciplines, faculty stressed the importance of the research question, which guides the research process from literature review to analysis and presentation. Lacking a good research question, students spend too much time conducting "endless lit reviews" and may run out of time for integration and analysis.

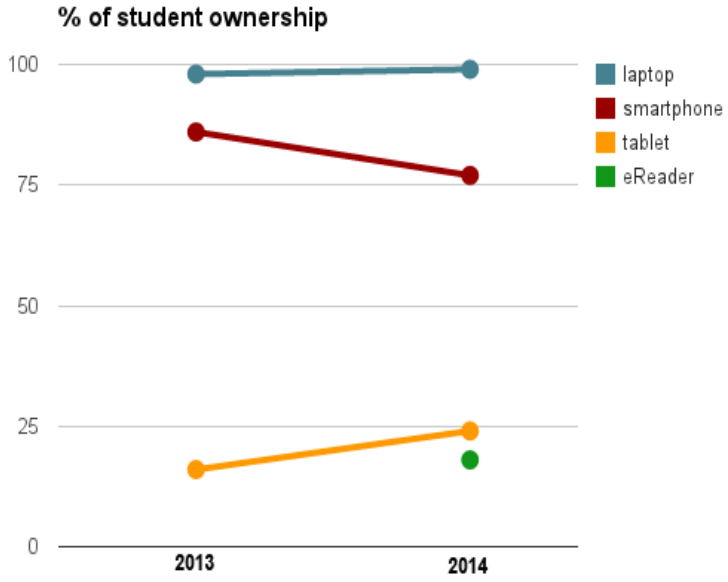
A successful project is when a student starts to get a notion of what it means to find a question. And then, what are the parts that you break a process into to get at that question. You might not succeed fully in getting at the question, but you know what the process is.

Students need enough discipline-specific context to ask meaningful questions and to think like a scholar in that field. In many cases, students also need to acquire specific techniques and methods, such as laboratory techniques, mathematical analysis, programming, foreign language fluency, or expertise with specialized software.

Faculty often feel challenged by time constraints and widely varying student experience to teach the mix of content, skills, and methods that enable students to successfully engage in the research process.

Student Experiences and Perspectives

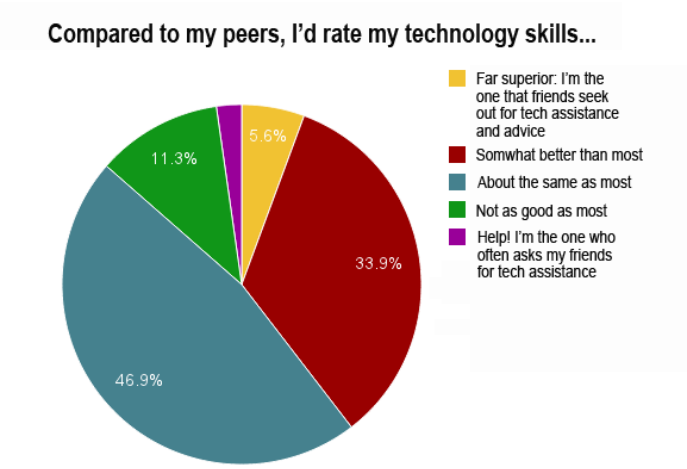
Student technology



Consistent with the 2013 student mobile device survey, nearly all students own a laptop computer. The majority of student computers are Macintosh-based, but a significant minority use Windows (28%) or linux (6%) (categories are not mutually exclusive, since about 10% of respondents own more than one laptop).

Smartphone ownership is also quite high, especially compared to student ownership of tablets and dedicated eReaders such as Kindle and Nooks. As with laptops, Apple products are the majority in each category, though there is a significant minority market share, especially of Android products.

Reed student technology ownership patterns are consistent with those reported in the 2013 EDUCAUSE Study of Undergraduate Students and Information Technology (see ECAR 2013 student study, pg. 26).



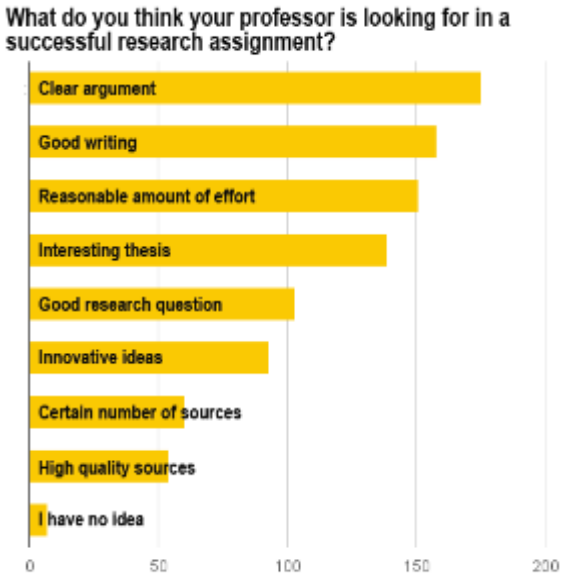
When asked to rate their technology expertise, Reed sophomores and juniors mostly view their technology skills as comparable or slightly better than their peers. Fewer than

14% feel their technology skills are worse than their peers.

Student research experiences

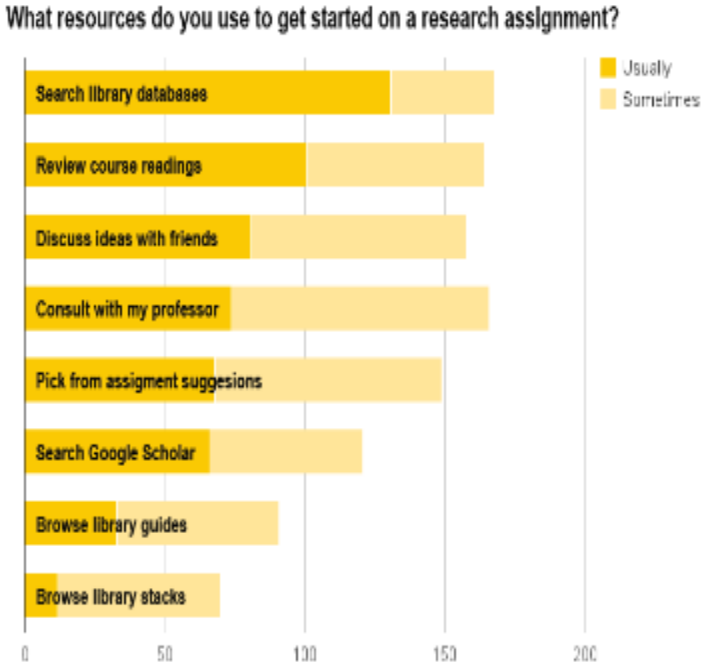
Students participate in a wide variety of research assignments. The most common assignment is a research proposal (74%) followed by oral presentations (63%), "close reading" or interpretation of texts (63%), literature review (62%), and an argument about an issue or topic (57%). Slightly more than half the students had assignments such as lab reports, analysis exercises (e.g., problem sets), and annotated bibliographies.

While faculty placed great emphasis on the research question, only 58% of students identified it as important to faculty. Students were more likely to emphasize the products of research, such as a clear argument and good writing, though they also recognize that many faculty expect reasonable amount of effort—not necessarily a perfect product. Relatively few students think that faculty are looking for a certain number or quality of sources in a research assignment.



Sources students use

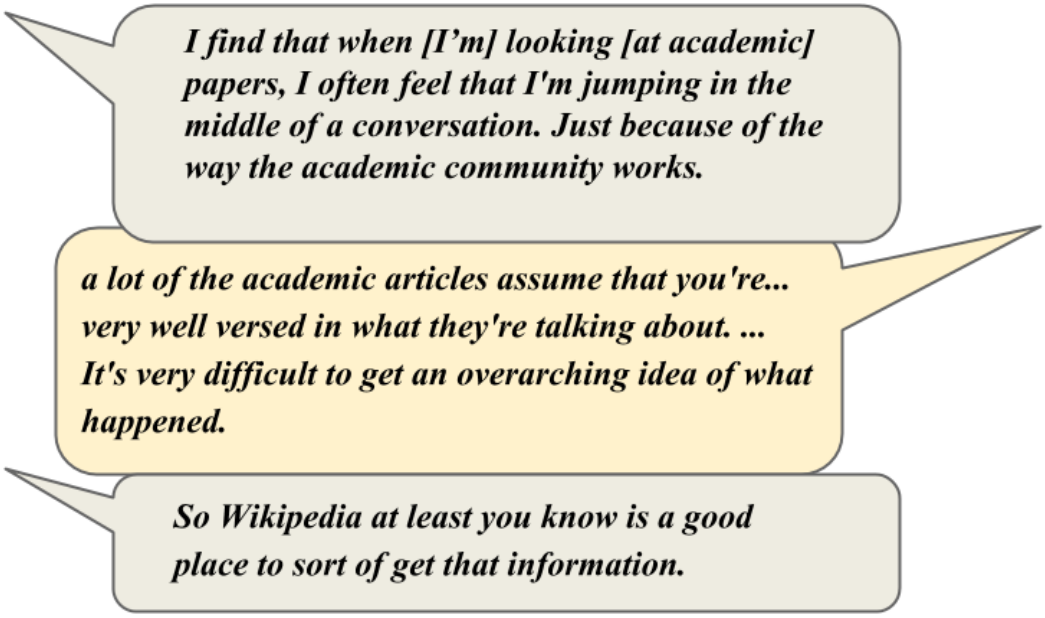
When getting started on a research assignment, students are most likely to search library databases. They also review course readings for ideas, discuss ideas with friends, and consult their professors at least sometimes, but they rarely consult library research guides. Consistent with their inclination to search library databases, when they're gathering information and data, students usually discover and refine search terms and look for citations in articles they have read. Most students do not use citation management software to organize their resources as they work.



While some studies, such as Project Information Literacy, find that students

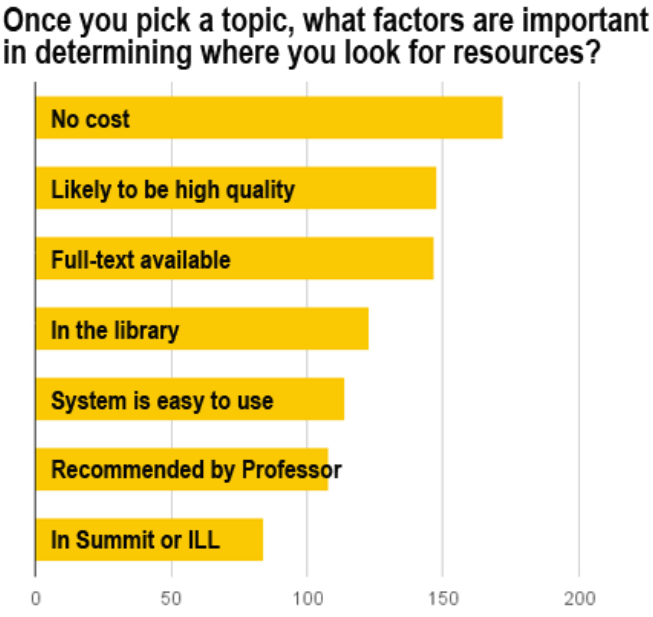
rely heavily on Google, Reed students expressed strongly divergent opinions on the value of Google as a scholarly resource. Fewer than half the students "usually" use Google Scholar and some of the focus group participants opined that it wasn't especially useful as a scholarly resource. On the other hand, some students felt they could find anything they need via Google.

For many mid-level students it can be especially challenging to delve into a research topic if they don't have sufficient background to understand the scholarly context. Google and Wikipedia both serve as a useful starting point and to provide background information and links to relevant articles. However, faculty expressed some frustration that students default to using Google when more discipline-specific databases would be more efficient and relevant.



Preferred formats and working with texts
PDFs of scholarly articles are by far the most commonly used information format for students working on research assignments. Fewer than half the students report that they usually use printed books, whether from the Reed Library or Summit/ILL.

When deciding where to look for scholarly resources, almost all students consider whether the materials will be available for free. Students



also consider whether the resources are likely to be high quality and available in full-text.

Factors such as whether the materials are readily available in the Reed Library or through Summit/ILL are less important, which is consistent with the generally lower use of books, compared to journal articles.

Only about half the students consider whether a particular system is easy to use for locating resources. That said, some students expressed frustration with using the library databases and how the time required to use the systems cuts into the time available for other phases of their research projects. This problem is consistent with faculty concerns that mid-level students are inefficient in selecting databases and searching for resources.

> ***The most recent research project that I have been doing is my qual. I have to have four to five sources... so I was searching around in the online journal databases that the library has, and it's really difficult to search in those. I definitely found myself struggling to find sources that were any way relevant to what I was trying to do and just kind of not knowing where to go and then what words to use, and I found myself kind of relying on the professors to direct me.***

Ebooks are a relatively new format at Reed and adoption rates are still low. About half of the students sometimes use ebooks but very few usually do. Students are more likely to use ebooks that are available through course reserves, rather than purchasing them or locating them on their own through the library. For those who have used ebooks, it is important to them that they can get access whenever they want, download the ebook for offline reading, and save annotations.

When annotating readings, most students either physically write on a printed PDF or book or annotate on a computer. Few students use tablets or note-taking applications. This reflects the relatively low levels of tablet adoption, and that few students are aware of technology resources available to them, which was a common theme in the focus group sessions.

Working with data

Most students have worked with data in research assignments, with a heavy emphasis on quantitative data. Data collected in a lab is by far the most common, though barely more than half (55%) of students have worked with data they collected in lab. Only 40% of students have worked with data they retrieved from a database, with science repositories being most common.

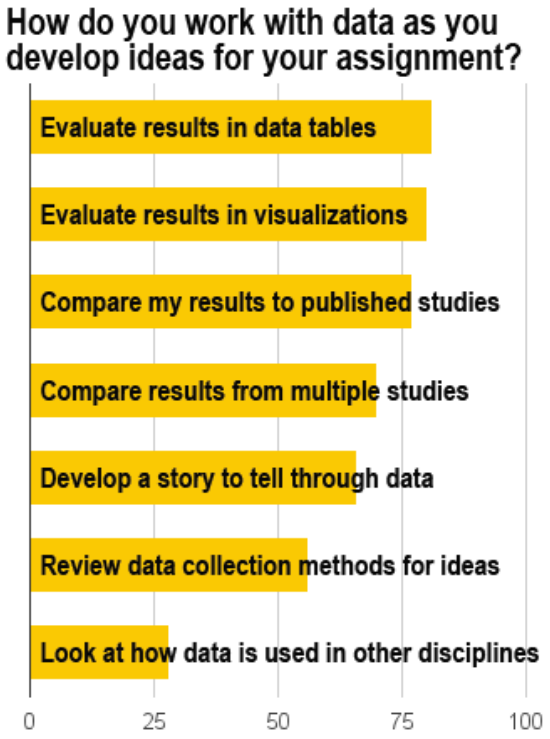
Only about 25% of students had experience working with qualitative data such as interviews and observations, but qualitative methods were mentioned in the focus groups by several students and faculty in a variety of disciplines. Based on faculty comments, qualitative methods may be a growing area of focus with a need for more comprehensive instruction and support.

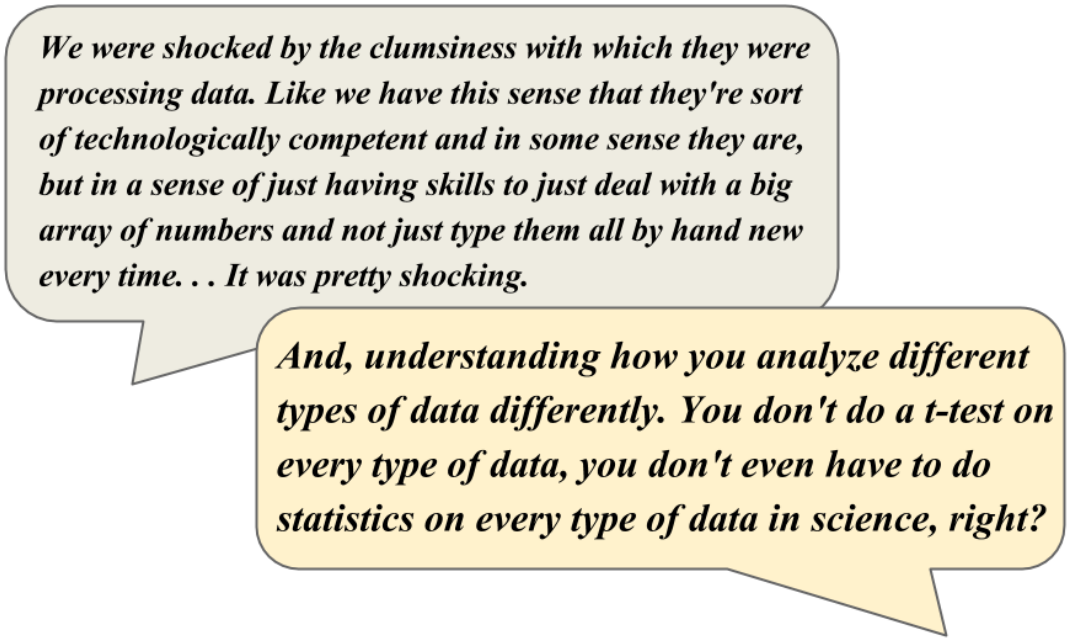
25 students (14%) reported never working with data in a research assignment. This is not a function of year in school, since these students are evenly divided between sophomores and juniors.

While students generally recognize it is important to review texts as they develop their ideas, they are much less likely to think about and use data as a foundation for their thinking. Fewer than half the students reported that they evaluate data collection methods and results from other studies as they develop their own ideas.

Compared to working with texts, mid-level students are relatively inexperienced in thinking about and working with data in their research assignments. They use a relatively narrow set of tools for managing, analyzing and presenting their data.

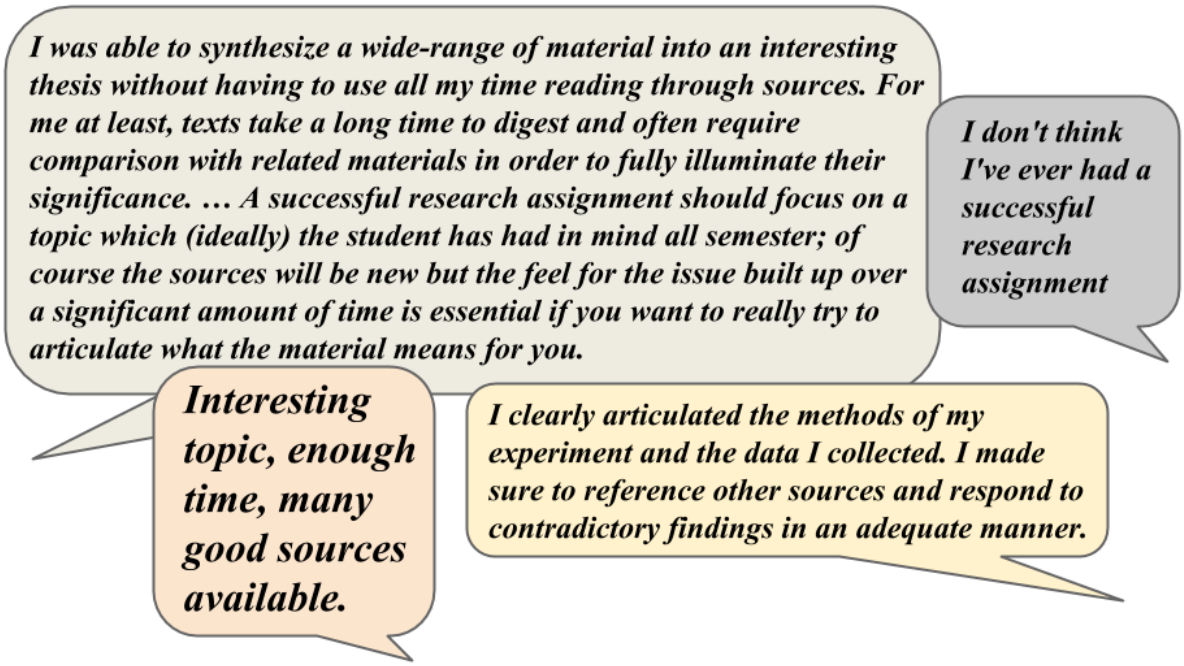
Indeed, several faculty expressed concern that students aren't very sophisticated in their understanding of how to analyze different types of data, or their use of technology for data analysis.



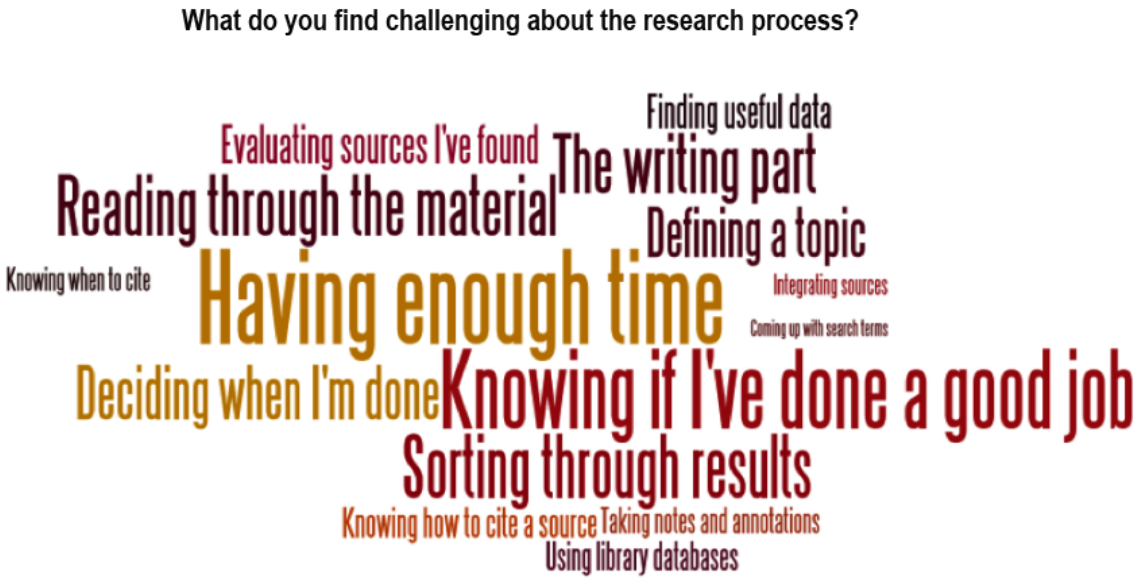


Research successes and challenges

When asked what makes a successful research assignment, many students are both insightful and pragmatic. They recognize the need to understand the underlying context and marshal data and sources to support their argument. It is important to many students that their topic is both personally interesting and innovative.



Students know that research takes a lot of time and for many it is the number one challenge in completing a successful assignment. They often have difficulty in estimating and planning for the time required and are painfully aware that the quality of the assignment suffers as a result. Students also find it challenging to decide when they are done, or even know if they have done a

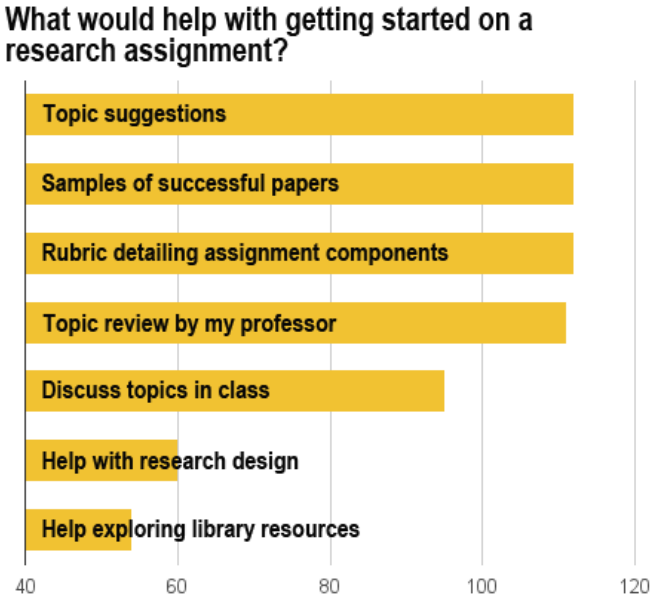


good job. Faculty expectations are often not well understood by mid-level students.
Most students do not feel challenged by the practical aspects of working with library databases, knowing what to cite or how to cite it, or finding useful data. However, faculty don't always agree that students are skilled at these aspects of the research process. Many faculty spoke of students who used inefficient strategies for locating and organizing resources, and conducting appropriate analyses on the resulting texts and data.

What would help

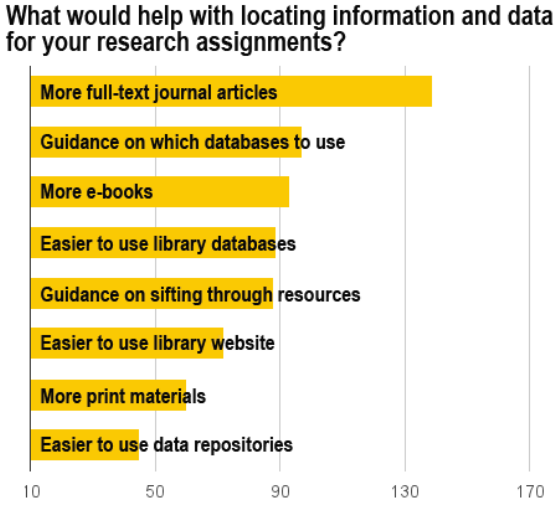
Students identified a wide variety of resources and services that would support their research efforts at each stage of the research process.

When it comes to getting started, students would most appreciate services that help them select a good topic and better understand the details of what is expected. Most students do not think they need help exploring library resources, although their professors might not agree with that assessment.



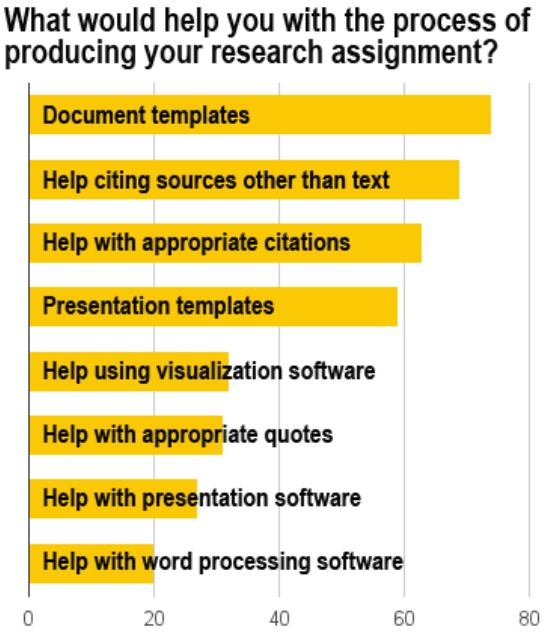
The interest in rubrics was a bit of a surprise in this study. We added rubrics to the answer set after it was mentioned in the student focus groups and, indeed, nearly two-thirds of students said rubrics would help them get started on research assignments. One student who received a rubric after her assignment was completed thought it would have been more useful to see the rubric in advance to clarify expectations.

During the information gathering stage, most students emphasize the importance of more full-text journals. Surprisingly, though relatively few students report feeling challenged by using library databases, many of them would like more guidance on which databases to use for their research assignments. This may be especially important for sophomores and juniors who may not have selected their major, or are relatively inexperienced in their discipline, so they are less familiar with discipline-specific resources.



Many students are unaware of how to effectively use technology tools for managing or annotating documents or data, but most are interested in expanding their technology toolset. Students are unlikely, however, to seek out new tools on their own or realize the value of tools when they are initially exposed to them. They are far more likely to use a tool when it is relevant to an assignment or when it is recommended by a professor.

When producing a research assignment, students report relatively few problems using software, but wish for more guidance with the appropriate format for research assignments. 42% of students expressed an interest in document templates and 33% in presentation templates. Although students reported few challenges with citations (see Challenges section above), many students expressed a desire for help with appropriate citations and citing sources other than texts.



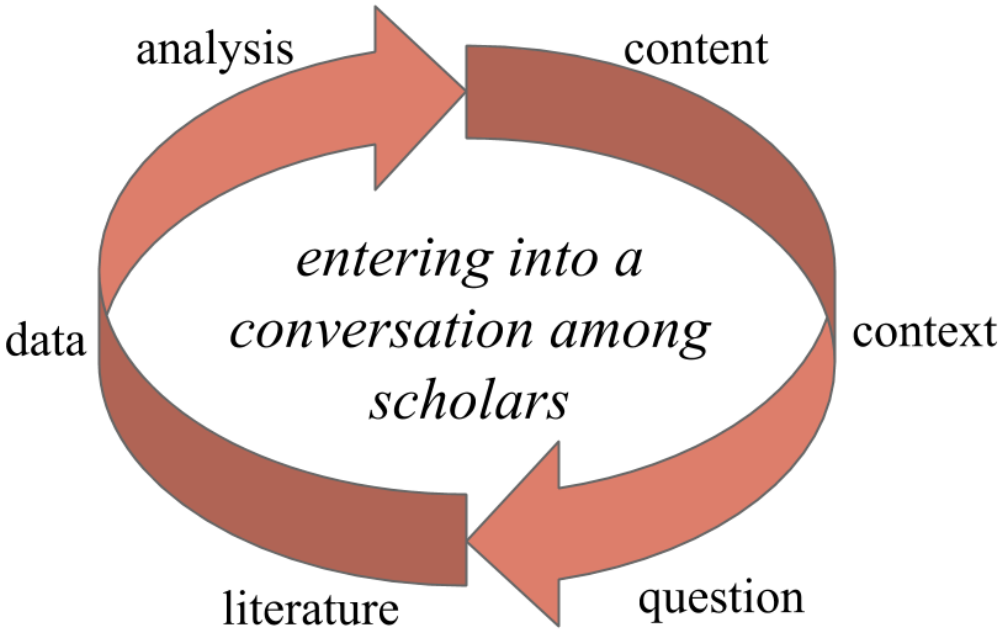
Overall, students are more likely to use help resources that are designed for a particular

course or discipline. 66% indicated that they are likely to use discipline specific course pages and 63% are likely to use integrated course specific help pages. Students are considerably less likely to ask a person (e.g., tutor, library staff, CIS) for assistance.

Conclusions

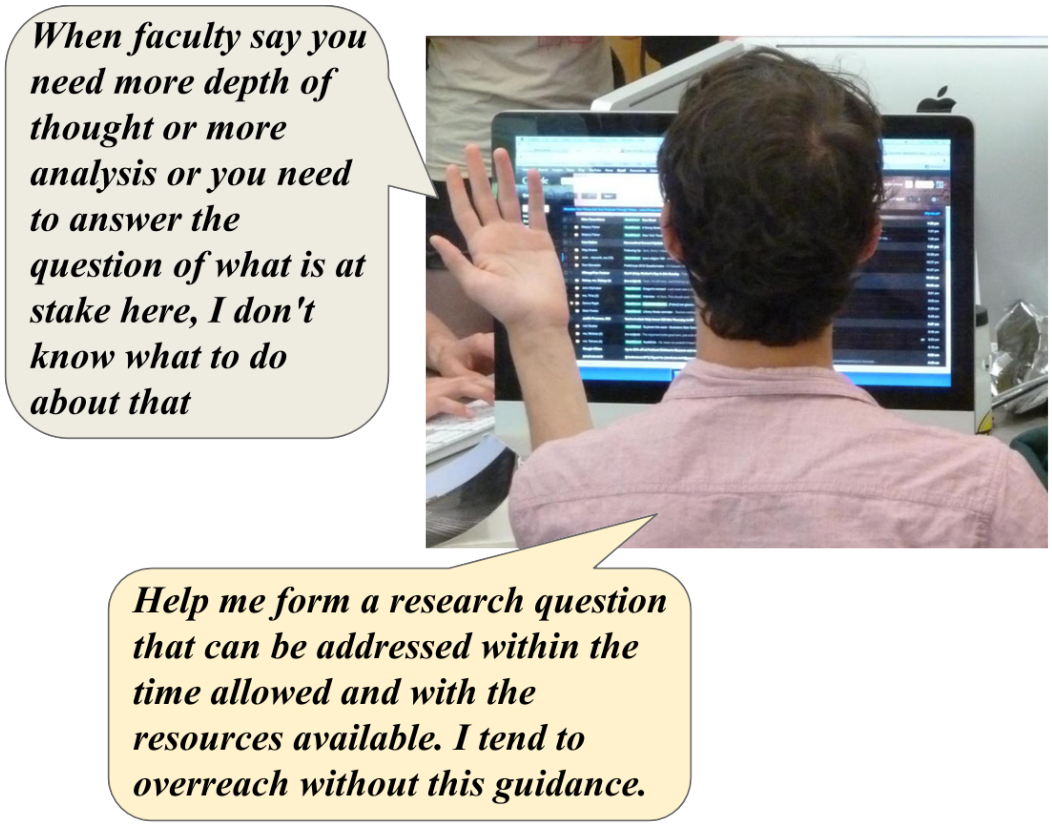
Both students and faculty spoke of research as a conversation among scholars. For many students, it can be challenging to effectively insert themselves into that conversation. While we may think of research as a series of distinct processes, in reality the stages are murky and interconnected. Students need to absorb enough content to understand the disciplinary context before they can ask a meaningful research question. The research question then guides their literature review, methodology, and data collection.

Many faculty view research assignments as practice and an introduction to both the content and methods in a particular discipline. Faculty are often more interested in the process that students use than the particular outcomes. Many students seem to get "stuck" at the literature review phase. They place great importance on tracking down every article they can find, and feel quite frustrated when it isn't available (or is in a different language). Faculty emphasized thoughtful analysis, more than "endless lit reviews." But many students aren't sure how to progress beyond the literature review phase. When faculty say they need "more analysis," students aren't sure what that means.



Students want more guidance, especially from faculty. They would benefit from assignments that help them deconstruct the various components of a research assignment. That said, faculty also

expressed that students need to then integrate the pieces into a unified whole. This is a tall order for young students. While many of them have a good idea what is required, they need opportunities to practice and develop their skills.



Evidence to Scholarship Project Activities

With support from the Keck and Mellon Foundations, the Evidence to Scholarship project facilitates collaboration between faculty, and CIS and Library staff to better support sophomores and juniors as they learn independent research skills. Project activities are focused on three primary goals:

- Improve student access to digital materials
- Build quantitative skills
- Support independent student research

Curriculum Strategies

Instructional technologists and librarians have begun collaborating with faculty in a variety of disciplines on projects that focus on one or more of the above goals:

Quantitative Skills Workshop Series with Michael Pitts was designed to teach students the basic data skills they need to get started on a quantitative thesis. The second series of workshops was designed based on feedback from the first series and starts in Fall 2014.

- Spring 2014 Series
    - Introduction to Excel (2/4 and 2/7)
    - Data Analysis using R (2/11)
    - Data Analysis using Stata (2/18)
    - Introduction to MATLAB (2/25)
    - Data Visualization (3/4)
    - Typesetting with LaTeX (3/11)
- Fall 2014 Series
    - Data Management (9/17, 4:30-5:30pm, L17)
    - Data Ethics (9/24, 4:30-5:30pm, L17)
    - Data Analysis with Stata (10/1, 4:30-5:30pm, ETC 205)
    - Data Analysis with R (10/8, 4:30-5:30pm, ETC 205)
    - Data Visualization (10/8, 4:30-5:30pm, ETC 205)

Psychology 351: Psychopathology with Kris Anderson
This course was redesigned over the summer and is being taught in Fall 2014 and again in Spring 2015. The newly designed course includes WordPress-based student portfolios, Zotero, an online textbook with interactive elements and quiz modules, and assignments focused on building independent research and digital skills. Kris is teaching the course using a flipped classroom model where students master factual material outside of class so that class time can be devoted to discussion, group work, and peer teaching; students will spend one class session a week developing their technology, research, and collaboration skills in hands-on workshops for the first three weeks and group work for the remainder of the semester.

Anthropology 315: Language and Colonialism with Courtney Handman
This is an upcoming project.

Music Research Competencies with Morgan Luker

- Music 344: Junior seminar, Ideologies of Improvisation
- Music 230: Tango: Music, Culture and History
- Music 150: The Cultural Study of Music

Services and Resources
Based on our findings from the needs assessment and prior assessments, we have also been working on projects to support student research, including:

The *Dataverse Pilot Project* is a collaboration with Linguistics professors Kara Becker and Sameer ud Dowla Khan. This project will test the use of the Dataverse platform as an institutional data repository for preserving and sharing faculty research data. The collaboration will result in the development of templates, workflows, and best practices that can be transferred to faculty in other departments who wish to preserve and/or share their own research data.

The *E-Reserves Project* started with a comprehensive review of the library's e-reserve archives and procedures, in order to improve the quality of e-reserves. Project staff investigated the optimal quality that e-reserve articles should meet and implemented improvements, including optical character recognition and high quality scans of articles.

Data@Reed is a joint effort between the Library, CIS, and the DoJo to centralize data-related services. The Data@Reed team is available to help students, faculty, and staff with all stages of the research data lifecycle, from creating a data management plan to analyzing, presenting, and visualizing results. We provide assistance with a variety of quantitative and qualitative analysis tools, and also help researchers prepare and submit their research datasets for preservation in a data repository. Project staff are currently working with faculty members in Linguistics, Mathematics, and Psychology to develop online resources to help students use data analysis tools such as R, Stata, Excel, and Google Spreadsheets more effectively.

Appendices – Needs Assessment Methods

- Faculty Focus Group Questions
- Student Focus Group Questions
- Student Research Needs Survey

Faculty Focus Group Questions

Let's start with a round of introductions. We don't need to know your name, but could you tell us your department and your areas of expertise?

Thinking about some of your classes for sophomores and juniors, what sort of research projects do you assign?

When mid-level students work on a research assignment, how do their strategies differ from those used by more experienced students, or even yourself?

What are the hallmarks of a successful student research assignment?

What kinds of instruction do you think could help sophomores and juniors learn independent research methods?

What technologies and support services do you think could help them be more successful in their research assignments?

Is there anything else about supporting student research that we haven't discussed?

Student Focus Group Questions

Let's start with introductions. We don't need to know your name but could you tell us your year in school and your major or subject you're thinking of majoring in?

Thinking about some of your recent classes, what sort of research projects were assigned?

What do you think your professor was looking for in the assignment?

What was your strategy and process to do the assignment?

When you think about a successful research assignment, what made it great?

What do you think is hard about doing research? What sorts of things were barriers or challenges for you?

When you need help with a research assignment, what do you do?

What do you think faculty could do to assist in your research efforts?

Backup Questions:

When materials aren't given to you for class, where do you look for texts or other digital materials to use in your assignments?

Have you ever used e-Books through the Reed Library? How did that work?

When you get eReserves through Moodle, how well does that work for you?

Do you use a mobile device (iPad, e-Reader, smartphone, etc.) for course readings? If so, what works well and what doesn't?

When you had course assignments that involved data, what software did you use? How was that process for you?

Is there any particular technology or tool you like to use for your assignments? Is technology helpful, or does it get in the way?

What technology and services that you don't currently have would help you?

Is there anything else about your research assignments that we haven't discussed?

Student Research Needs Survey

CIS and the Library, working in partnership with faculty, are working to improve support for all facets of student research at Reed, especially for sophomores and juniors. We are interested in learning more about how you approach research assignments in your courses, and your perspectives on what tools and services would help you be successful.

The research needs survey will take about 10-15 minutes to complete. At the end of the survey you will receive a link to enter the drawing for an iPad mini. Your name and contact information will not be associated with your responses to the survey.

Please respond by April ____ to be entered into a drawing for an iPad mini.

I. About Yourself

1. What is your major?
    - value list of Reed majors

2. What is your year in school?
    - sophomore
    - junior

3. Do you own any of these devices? *check all that apply*

Laptop computer
- Mac
- Windows
- Linux
- None
- Other

Desktop computer
- Mac
- Windows
- Linux
- None
- Other

Smartphone

- iOS (iPhone)
- Android
- Windows
- Blackberry
- None
- Other

Tablet
- iOS (iPad)
- Android
- Windows
- BlackBerry
- None
- Other

Dedicated e-reader
- Kindle
- Nook
- Sony Reader
- None
- Other dedicated e-reader

4. Compared to my peers, I'd rate my technology skills as
- Far superior: I'm the one that friends seek out for tech assistance and advice
- Somewhat better than most
- About the same as most
- Not as good as most
- Help! I'm the one who often asks my friends for tech assistance

II. About your research assignments

1.Thinking about some of your recent classes, which of the following types of written research projects were assigned? *check all that apply*
- Literature review
- Research proposal
- Annotated bibliography
- Lab report
- Argument about an issue or topic
- Historical analysis of an event
- "Close reading" or interpretation of a text

- Case study analysis
- Oral presentation
- Poster
- Analysis exercises (e.g., problem sets)
- Multimedia project (e.g., Web site, video)
- Other (describe)

2. What types of data have you used for your research assignments? *check all that apply*
- Quantitative data I collected in a lab
- Quantitative data I gathered in the field
- Quantitative data I collected with a survey
- Quantitative data retrieved from a database (e.g., Census, GenBank)
- Quantitative data provided by my professor
- Qualitative data from ethnographic research (e.g., interviews, observations)
- Network data (nodes and ties)
- Images collected in a lab (e.g., microscope images)
- Images collected in the field
- Spatial data (e.g., GIS)
- Social networking data (e.g., Twitter)
- Other (describe)

III. Getting started - choosing and defining a topic

1. When you first begin a research assignment, how often do you use these research strategies to identify your topic?
- Pick from suggestions in my research assignment
- Review course readings to identify research questions
- Browse the course and subject guides on the library website
- Browse the library stacks in my topic area
- Search Google Scholar to see what's available
- Search library databases (eg, JSTOR, EBSCO) to see what's available
- Read articles to get broad background information
- Consult with my professor to discuss my topic
- Discuss ideas with my friends
- Develop a research plan to guide my process
- Other (describe)
    - Usually
    - Sometimes

    - Never
    - Don't Know

2. What do you think your professor is looking for in a successful research assignment? *check all that apply*

- Interesting thesis
- Clear argument
- Innovative ideas
- Good writing
- A research question that builds on previous research in the field
- A certain number of sources
- The number of sources doesn't matter as long as they are scholarly
- A reasonable amount of effort
- I have no idea
- Other (describe)

3. What would help you with the process of getting started on a research assignment? *check all that apply*

- Topic suggestions from my professor
- Topic review by my professor
- Discuss topic ideas in class
- Samples of successful past assignments
- A rubric detailing the components of the assignment
- Assistance exploring library resources
- Assistance with research design
- Other (describe)

IV. Information Seeking - finding information & data

1. Once you pick a topic, how important are the following factors in determining where you will look for resources?

- Resources are available in the library
- Resources are available through Summit or ILL
- Full-text is available electronically
- Resources are available for no cost
- Resources are likely to be high quality
- Resources are recommended by my professor
- The system is easy to use
- Other (describe)

    - Important
    - Neutral
    - Not important
    - Don't know

2. How often do you consult these resources for your research assignments?

- Course readings
- Search engines (e.g., Google, Yahoo!)
- Google Scholar
- Wikipedia
- Library databases (e.g., EBSCO, JSTOR, PubMed)
- Library catalog
- Government Web sites (.gov sites)
- Blogs
- My personal collection (materials I already own or buy)
- Faculty
- Librarians
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

3. When you find a source for your research project, how often do you consider the following criteria?

- How current the source is
- An author's credentials
- Whether the source has a bibliography
- Whether charts and graphs have meaningful data
- Who published the source
- Whether a librarian mentioned using the source
- Whether I have ever heard of the source before
- Whether I have used the source before
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

4. How often do you use each of these research practices during the information and data

gathering stages of your research assignments?

- I discover and refine search terms
- I look for citations in articles that I have read
- I use general-purpose software to organize resources as I collect them (e.g., Google Docs, Dropbox)
- I use citation and document management software to organize resources as I collect them (e.g., EndNote, Zotero)
- I develop a plan for managing my data
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

5. When you need to locate data, how often do you use the following sources?

- Social science repositories (e.g., ICPSR)
- Science data repositories (e.g., Protein Data Bank, National Space Science Data Center)
- Economic data repositories (e.g., NBER, OECD iLibrary)
- Government repositories (e.g., Bureau of Labor Statistics, Census)
- Spatial data repositories (e.g., ESRI, Metro/RLIS)
- Data repository aggregator (e.g., DataBib, re3data)
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

6. Where do you store data that you have collected? *check all that apply*

- Computer that I own
- Computer in a research lab
- Reed's AFS file server
- Google Drive / Google Docs
- Dropbox
- External device (e.g. hard drive, flash drive)
- Other (describe)

7. What would help you with the process of locating information and data for your research assignments? *check all that apply*

- Assistance defining search terms relevant to my topic
- Guidance on which library databases to use for my topic
- Guidance on how to sift through too many resources
- Easier to use the library web site
- Easier to use library databases
- Easier to use data repositories
- More print materials in the Library
- More e-Books through the Library
- More full-text journal articles through the Library
- Other (describe)

V. Research process - evaluating and analyzing information & data

1. How do you work with texts as you develop ideas for your assignment? *check all that apply*
   - Read several sources first and then formulate a thesis
   - Develop my thesis and then look for sources that support it
   - Gather as many sources as possible so I know I'll have something to support my argument
   - Read as many sources as possible so I understand all facets of the debate
   - Focus on a few sources from key scholars or classic works
   - Look for sources that contradict my thesis so I can address them
   - As my analysis evolves I look for new sources
   - Other (describe)

2. How do you work with data as you develop ideas for your assignment? *check all that apply*
   - Review data collection methods to get ideas for my own project
   - Look at how data is used in other disciplines to get ideas for my project
   - Develop a story that I want to tell through data
   - Evaluate research results presented in data tables
   - Evaluate research results presented in data visualizations (e.g., charts, graphs)
   - Compare results from multiple published studies
   - Compare my results to published studies
   - Other (describe)

3. How often do you use the following information formats in your research?
   - PDF of an article from a scholarly database
   - PDF of an article from Summit or Interlibrary Loan (ILL)
   - Printed book from the library
   - Printed book from Summit or ILL
   - Printed book that I own

- Printed journals in the library
- e-Book on reserve in the library
- e-Book I found through the Library
- e-Book I purchased or rented
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

4. If you have used e-Books from the Library, how important are the following features for you?
- I can get access whenever I want
- I can download the e-Book
- I can print the e-Book
- I can save my annotations
- It is in a format that is compatible with my tablet or e-reader (e.g., iPad)
- Other (describe)
    - Important
    - Neutral
    - Not important
    - Don't know

5. What is your favorite way to read materials for your research assignments? *choose one*
- On paper
- On a computer
- On a tablet (e.g. iPad)
- On a dedicated eReader (e.g. Kindle)
- Other (describe)

6. How often do you use the following methods to annotate your readings?
- Print a document and write on it
- Write in a book
- Annotate on my computer
- Annotate on my iPad or tablet
- Write in a digital note-taking app (e.g., Evernote)
- Other (describe)
    - Usually
    - Sometimes
    - Never
    - Don't Know

8. Which of these programs have you used for analyzing data? *check all that apply*

- Spreadsheet software (e.g., Excel, Numbers)
- Statistical software (e.g., Stata, R, SPSS, JMP/SAS)
- Computational software (e.g., Mathematica, MATLAB, Sage)
- Geospatial software (e.g., ArcGIS, QGIS)
- Qualitative analysis software (e.g., Dedoose, NVivo)
- Graphics software (e.g., Photoshop)
- Other (describe)

9. What would help you with the process of analyzing sources and data for your research assignments?

- Tools for managing my documents
- Tools for annotating documents
- Tools for managing my notes
- Tools for managing my data
- Assistance understanding my data
- Assistance understanding what analysis to conduct
- Tools that help me organize my ideas and related sources
- Other

VI. Research outcomes - writing, visualization, presentations, and citations

1. Which of these programs have you used for producing research papers? *check all that apply*

- Word
- Pages
- Google Docs / Google Drive
- Open source office apps (e.g., LibreOffice, OpenOffice)
- LaTeX
- Citation software (e.g., BibTeX, EndNote, Zotero)
- Other (describe)

2. Which of these programs have you used for producing presentations? *check all that apply*

- Powerpoint
- Keynote
- Prezi
- Other (describe)

3. Which of these programs have you used for visualizing and presenting data? *check all that apply*

- Statistical software (e.g., Stata, R, JMP/SAS)
- Computational software (e.g., Mathematica, MATLAB, Sage)
- Geospatial software (e.g., ArcGIS, QGIS)
- Qualitative analysis software (e.g., Dedoose, NVivo)
- Software for data visualization (e.g., Tableau)
- Programming tools for data visualization (e.g., D3.js)
- Graphics software (e.g., Photoshop, GIMP)
- Vector graphics software (e.g., Illustrator, Sketch)
- Visualization tools specific to a laboratory instrument
- Other (describe)

4. What would help you with the process of producing your research assignment? *check all that apply*

- Document templates
- Presentation templates
- Help using word processing software
- Help using visualization software
- Help using presentation software
- Help with appropriate quotes
- Help with appropriate citations
- Help citing sources other than texts (e.g., images, audio, video, maps)
- Other (describe)

VII. Reflection - what is hard, what would help

When you think about the entire research process--from the moment you get the assignment until you turn in your research paper--what is challenging for you?

How often do you find the following research activities challenging?

- Defining a topic
- Coming up with search terms
- Finding articles in the library's research databases (e.g., EBSCO, JSTOR)
- Sorting through all the irrelevant results to find what I need
- Evaluating the sources I've found
- Finding useful data
- Reading through the material
- Taking notes and annotations

- Integrating different sources from my research into my assignment
- The writing part
- Having enough time
- Knowing when I should cite a source
- Knowing how to cite a source in the right format
- Deciding whether or not "I'm done"
- Knowing whether or not I've done a good job
    - Usually
    - Sometimes
    - Never
    - Don’t know

2. When you think about a successful research assignment, what made it great?

3. What could your faculty do to help you with research assignments?

4. What services and support would help you on research assignments?

5. How likely would you be to use services and support provided in the following ways?
- Training built into my academic class
- Training offered outside my academic class
- Training on the web
- General purpose help pages provided by Reed
- Discipline specific help pages provided by Reed
- Course specific help pages integrated with my class
- A person in the Library I can ask for help
- A person in CIS I can ask for help
- A person in the tutoring center I can ask for help
- Other
    - Sure!
    - Maybe
    - Probably not
    - Don’t Know

6. Is there anything else you would like to tell us about your research needs?

<submit>