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Nancy King
Credo Reference, nlking@gmail.com

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WHAT WE LEARNED FROM USERS: LESSONS LEARNED FROM OUR STUDENT USERS

Nancy King (nancy.king@credoreference.com), *Product Manager, Credo Reference*

How can we build a site that both students and librarians love to use? With all the information resources available today, both vendors and libraries face the same challenge: reaching and appealing to the end user. A student's research process might include the library, but more often the search starts outside the library, online at Google Scholar, Wikipedia or another open web resource. How can library resources get in the workflow of the student researcher? When students are working on a paper, what steps do they take? What sites do they visit? How do they evaluate their options? To help answer these questions, Credo Reference used focus groups and usability testing to explore how students gather information for their class projects and the difficulties they encounter along the way. This paper describes the methodology and findings of our tests.

Method

Credo Reference took a two-tiered approach to understanding the needs of student researchers. We used both a focus group and usability testing to learn more about students' web usage, research habits and how Credo might fit into their overall process. Our focus group, held in June 2009, was used to test the validity of a new feature¹ that Credo was exploring and learn what tools students needed to more effectively research their coursework. Credo also has conducted two rounds of usability sessions to gain more understanding of user search behavior. These are all part of an ongoing process to learn more about students' needs.

Recruiting

For our initial usability test in May 2009, we tried various approaches to find students. Initially, we hung posters around college campuses in Boston as well as contacted librarians at a number of our customers in the area, asking them to promote the opportunity to their students. Both of these approaches had limited success as it was nearing the end of the spring semester, and students were busy with finals. We also tried recruiting students through college newspapers, but none of the student papers was able to run an advertisement for us. Finally, we posted advertisements on Facebook to find students. Facebook allows very focused targeting of ads, and we were able to find college students in the Boston area. Facebook was the most effective means for recruitment because of the numbers of students using it.² Facebook was used as the only recruiting method for the subsequent round of usability testing and for the focus group.

Focus group

Six students were recruited and participated in our focus group discussion. We were most interested in the opinions of students with a few years' experience writing college-level research papers and decided to limit participants to juniors and seniors. Students who attended were from Harvard University, Yale University, Tufts University, American University, University of Massachusetts-Lowell and Boston University. For our focus group, we selected students from current Credo customers and students who attended colleges where Credo wasn't available. None of the students was familiar with Credo. To receive varied feedback from the students, we selected those with a wide range of majors. Art History, Political Science, International

Relations, Social Studies, International Studies and French, and Literature were all represented. Students were offered \$75 to participate.

The major questions that we wanted to answer were:

- How are students using the web? What sites are they visiting most often?
- Where do students begin their research?
- How do they decide what resources to use?
- What does reference mean to them, and do they ever use it as part of their research?
- How can Credo Reference fit into their overall research process?

We were also interested in testing the validity of a new feature on the Credo site that we hoped would address their research needs. Specifically, the goal was to learn whether our new feature, called Topic Pages, would help users understand the context for their topic, provide a way to find more in-depth content and be available in their research workflow.

Results

Our session with students began with a discussion of how they use the web. Many of the items mentioned were not a surprise. All six of our students were regular users of Facebook, online video sites like YouTube and Hulu, and news sites like the New York Times or CNN. They are on and off the web all day during the school year.

In order to learn about each student's research process, we asked them to describe the last research paper that they had written and how they went about completing the research for it. All six started with resources that their professors had recommended. Five out of the six mentioned specific library databases that they had used. Two of the six typically started their research with Google Scholar. "[Google Scholar] is easier to use than each individual database." They used it as a means to find articles then accessed their library's databases to look up exact articles. All wanted ebook versions of every book so that they wouldn't have to find the print version. Google Books was mentioned as a great resource to see whether a book would be valuable to read. They read the excerpts to decide whether to read the entire book.

We asked how they decided which sites to use for their research. Most learned one database early in their college career and have used that same database ever since. They didn't appear to explore a wide number of databases. Figure 1 outlines each student who participated and their responses to our research paper questions.

Student	1	2	3	4	5	6
School	Boston University	Tufts University	Yale University	UMass-Lowell	American University	Harvard University
Major	Literature	Art History	International Studies & French	Political Science	International Relations	Social Studies
Average number of research papers/ semester	6	4	4	4	4	6
Subject of last paper written	Gertrude Stein	Genetic algorithms	Chinese-Cuban relations	Civil liberties – gay marriage	Legalization of prescription drugs	Reverse migration
Resources used	Primary sources, JSTOR, Books	Wikipedia, Google Scholar, JSTOR	Interviews, Speeches, Microfilm, Lexis-Nexis, JSTOR, ebrary, Books, Google Books	Books, References from other courses, Lexis-Nexis, JSTOR	Google Scholar, EBSCOhost, JSTOR, Books	Books, online databases (no exact ones named)

Figure 1: Focus group student participants



Figure 2: Screenshot of Credo Topic Page

participated. During the second test, we had two juniors and one senior with one student each from Brandeis University, Tufts University and Emerson College. All six students attend colleges that subscribe to Credo Reference, but none of them was familiar with Credo Reference. Similarly to our focus group, we selected students from a wide range of majors. Biology, marketing, politics, psychology, early childhood education and business management were all

Students were also asked to describe some of their difficulties when doing research. All agreed that finding the right keyword to search was the biggest challenge. They might start with a keyword that doesn't provide a large number of results and then are unable to find related topics that provide more content. Other times, they might start with a too-general keyword and have trouble narrowing their topic. One student mentioned that professors aren't helpful when it comes to searching library databases. One complaint about library journal databases was that they often have too many book reviews and can be too advanced.

The final portion of the focus group was dedicated to gathering feedback on Credo's new Topic Pages feature, shown in Figure 2. This feature, which pulls together a variety of resources around a single topic, is intended to provide context and paths to further study for students. The students' initial reaction was overwhelmingly positive. They talked about needing a starting point and home base for their research and felt that this feature met those needs.

Usability testing

Credo Reference's interface is based on our understanding of users' information-seeking behaviors and feedback that we've received from librarians. To help us understand how effective our implementation is, we have begun usability testing with students. This process is iterative, and we completed two rounds of usability testing prior to the Charleston Conference. Three students were recruited for each round of tests. In the first round,

two freshmen from Fisher College and one sophomore from Suffolk University

represented. Students were offered cash incentives to participate – \$40 for the first round or \$75 for the second round.

In the first round of testing, we wanted to answer two distinct questions:

- If students aren't instructed which resources to use, how will they complete their research for a paper?
- Are students able to complete that same research using Credo Reference?

Our second round of testing was more focused on the usability and functionality of current and new features of Credo. We examined questions such as:

- Are students who visit a new version of www.credoreference.com able to find their library and login to Credo?
- Do they find and use our new Topic Pages feature?
- How effective is Credo at guiding students to the information that they need for their research?
- Can students find specific tools within Credo, such as our Concept Map – a data visualization tool – and citation management tools?

We used two methods to collect data. The primary method was the think aloud protocol, where we observed students' movements and gathered feedback on their experiences. The students were asked to comment aloud on what they were thinking. Jakob Nielsen describes thinking aloud as "the single most valuable usability engineering method."³ The second method used was short interviews. We interviewed each participant before and after the testing.

We ran each test on a computer equipped with Morae software from TechSmith⁴. The software allowed us to record screen activities as well as video and audio for each student. Other team members can watch remotely during the live test or view the recording later.

Results

The first round of usability testing only included freshmen and sophomore students who had completed little college-level research as their courses hadn't yet required it. The first task asked students to research a paper as they normally would if given the assignment for class. All three students began their research at Google, and two of them commented that they would do the same thing if they were sitting inside the library. Tester #2 said, "Everything is Google for me." One of the students had a system for reviewing Google search results. She spent time looking for "credible sources" that included an author. She also mentioned the need to verify facts that she found through Google and would check the facts on another web site to ensure that they were correct. Only one of the students clicked past the first page of results on Google. This behavior is in line with Web search engine research that shows that 73% of users only viewed the first page of results.⁵ Tasks 2 and 3 asked students to research using Credo Reference. All three students felt that they had completed the tasks, but they didn't always find a result that was accurate for the task they were assigned. Specifically, the third task asked them to find a poster about the Russian Revolution, and all three of them settled on an image that wasn't a poster.

In retrospect, the tests might have been improved by asking students to research a paper that they had recently completed for class. They seemed very willing to settle for the first items that they found rather than completing the task as it was written.

Figure 3 summarizes the three tasks that users completed in our first round of testing.

Task 1	You are writing a paper on Ralph Waldo Emerson and his ties to the local area for your English class. How would you begin your research using the Web?
Task 2	A classmate has mentioned Credo Reference to you as a good source of information for your paper. Visit Credo and sign in to begin looking for information on Ralph Waldo Emerson's ties to the local area.
Task 3	You are giving a presentation in one of your classes on the Russian Revolution and art. Use Credo to find a poster that you can include.

Figure 3: Tasks for Credo's first round of usability testing

During our second round of usability testing we recruited juniors and seniors to participate. From these older students, we hoped to learn more about how their research process evolves over their college years as well as how effective Credo's interface is. Eight tasks, all focused on writing a paper about human rights, were completed by each student. Each task was intended to test a different aspect of the Credo interface. Described below are the tasks that presented the most problems for participating students.

Task 1 examined the effectiveness of our new landing page. The text on the Credo page had been written to speak to students' pain points, such as:

- Do they need help getting started on their research?
- Do they need to brainstorm ideas?

What we found was that students tended not to read the content of the page, but scanned it while looking for links to take them elsewhere. All three students initially overlooked the login button that would have helped them find their individual library's remote login. One of the students took more than four minutes to determine how to gain access to Credo. If not for the fact that she was completing a usability test, she would have given up much earlier in the process.

Task 1, along with Task 2, was also intended to test the functionality of our new Topic Pages feature. Of the three students that we tested, only one student actually found the Topic Pages in the search result. One ignored the Topic Page in the search results because he assumed that it was an advertisement. To him, it looked too different from the other search results. Our third tester also skipped over Topic Pages as she didn't want to use a result that was suggested to her. She preferred to examine the results and select the one that seemed most appropriate for the assigned task. Shown in Figure 4 is a screenshot of Credo's search results at the time of testing where Topic Pages were featured at the top of results with a „Start Here' suggestion. The results clearly indicated that the Topic Page result should look more like other results in order to encourage users to visit them.

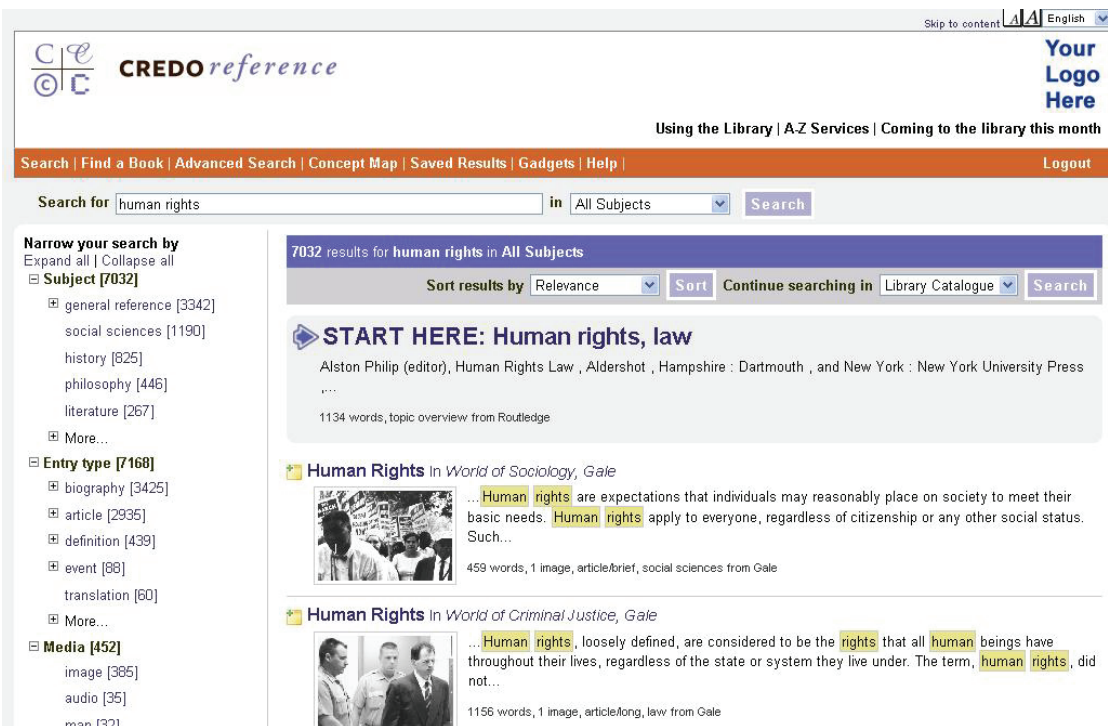


Figure 4: Credo search results screenshot

We also discovered that, even after students found the Topic Pages, they didn't understand all the information that was available on them. They missed a large portion of the content by not scrolling down the page.

Task 6 tested whether students were able to find our data visualization tool, the Concept Map. One of the students had discovered the tool earlier during his testing, but the other two students did not find the tool immediately. One of them visited the Concept Map after trying other options. The third student had to be shown where to go. She was extremely frustrated by the time, so we stepped in to help her.

One surprising finding of the tests was that students often used the facets on search results. They did so without being specifically asked to as part of a task. Up until this point, we were unsure if these items were used by end users.

This second round of testing could have been improved by asking the students to show how they would normally research a class assignment. We could have learned whether they visit their library's web site to begin or go to open web resources like Google or Google Scholar.

Figure 5 summarizes the eight tasks that users completed in our second round of testing.

Task 1	You have a paper to write on human rights. A classmate has mentioned Credo Reference to you as a good source of information for your paper. Visit credoreference.com and sign in to begin looking for information. Find a background article and definition of human rights to help you get started on your paper.
Task 2	Now that you have background information on your paper topic, you need additional information. Find 2-3 appropriate scholarly articles, a book and some recent news on human rights.
Task 3	You've decided to focus your paper on the human rights of migrant workers. You need a few images to include in your paper. Search Credo to find photos of migrants to include.
Task 4	While reading some of the items that you've found on Credo, you need a definition of the term – transmigrant. Look this word up to find its meaning. Save this word so that you can access it later.
Task 5	Your professor has recommended the book – „Encyclopedia of Mexico'. Find this book on Credo and see if it has any information on immigrant workers in the United States.
Task 6	Your friend who recommended Credo said that it has a great tool for brainstorming, and you could use some help finding related terms to migrant workers. Find this brainstorming tool and additional articles that might be useful for your paper. Mark 3 articles to use later.
Task 7	Search for migrant labor and then find a library book that you'd like to read.
Task 8	You've marked a number of articles while doing your research. Email these articles to yourself so that you can find them later.

Figure 5: Tasks for Credo's second round of usability testing

Implications

After completing usability testing, we reviewed the results and identified a number of changes to make, both short-term and long-term. In particular, students had little understanding of what Credo was or how the site might aid them in their research process. We identified changes that could help convey what Credo provides. As an example, we need to provide users with an understanding of all the available content on Topic Pages so that items below the “fold” are not missed. We need to strike a balance between number of items shown and the amount of detail for each, as suggested by Jakob Nielsen.⁶

Summary

Through the testing that Credo has completed, we discovered a couple items that we will continue in future testing.

- Test a wide range of users. Include students from every class and across majors. Each brings a different perspective to their research process.
- To recruit, reach out to students in the places where they're spending their time. We found Facebook to be the most effective method.
- Create a real-world set of tasks for users to complete during testing.

- Use the think aloud protocol to understand what users are thinking while they're on your site. Be sure not to give them hints about completing the tasks.
- Use tools like Morae to share your findings with other team members. They can watch the testing live or the recording at a later time. Seeing is much more powerful than reading a description of the problems that users are having.

¹ Nielsen, J. (1997). *The Use and Misuse of Focus Groups*. Retrieved from <http://www.useit.com/papers/focusgroups.html>

² Arrington, M. (2005). *85% of College Students use FaceBook*. Retrieved from <http://www.techcrunch.com/2005/09/07/85-of-college-students-use-facebook/>

³ Nielsen, J. (1993). Thinking Aloud. In *Usability Engineering* (pp. 195). San Diego: Academic Press.

⁴ Morae (Version 3.1.1) [Computer Software]. Okemos, MI: TechSmith.

⁵ Jansen, J. J. & Spink, A. (2006). How are we searching the World Wide Web? A comparison of nine search engine transaction logs. *Information Processing & Management*, 42, 257. doi:10.1016/j.ipm.2004.10.007

⁶ Nielsen, J. (2006). *Screen Resolution and Page Layout*. Retrieved from http://www.useit.com/alertbox/screen_resolution.html